Medway Estuary and Swale SMP

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1 INTRODUCTION

1.1 The Shoreline Management Plan

A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. In doing so, an SMP is a high-level document that forms an important part of the Department for Environment, Food and Rural Affairs (Defra) strategy for flood and coastal defence (Defra, 2001).

The boundaries of this SMP were determined as follows:

- Upstream limit (Medway): Normal tidal limit at Allington Lock Gate
- Upstream limit (Swale): Boundary with the Medway Estuary
- Downstream limit (Medway): River Medway Schedule 4 (Coast Protection Act 1949) Boundary with the coast and thus junction with the Isle of Grain to South Foreland SMP
- Downstream limit (Swale): The Swale Schedule 4 (Coast Protection Act 1949) Boundary with the coast and thus junction with the Isle of Grain to South Foreland SMP

Figures 1.3 and 1.4 show the area covered by the SMP.

1.1.1 Relationship with other plans

Shoreline Management Plans (SMPs) provide large-scale assessments of the risks associated with coastal processes for a specified length of coastline, and present policy frameworks to reduce these risks. As such, SMPs sit at the top of a hierarchy of plans that proceeds from SMPs to Strategy Plans to specific scheme designs:

Type of Plan	Purpose	Scale
Shoreline Management Plans	Aim to identify policies to manage coastal flood and erosion risks, deliver a wide ranging assessment of risks, opportunities, limits and areas of uncertainty	>150km Coast / River Catchment
Strategies	Aim to identify appropriate schemes to put the policies into practice, identify the preferred approach, including economic and environmental decisions	10-30km coast/ river
Schemes	Aim to identify the type of work to put the preferred scheme into practice, compares different options for putting the preferred scheme into practice	<5km

Throughout the SMP process it has been important to work closely with other studies and projects to make sure that these plans are co-ordinated and coherent. A range of plans are being developed / have been developed which link with the SMP to co-ordinate works for Flood and Erosion risk management in North Kent. These are illustrated in Figure 1.1 and described overleaf.

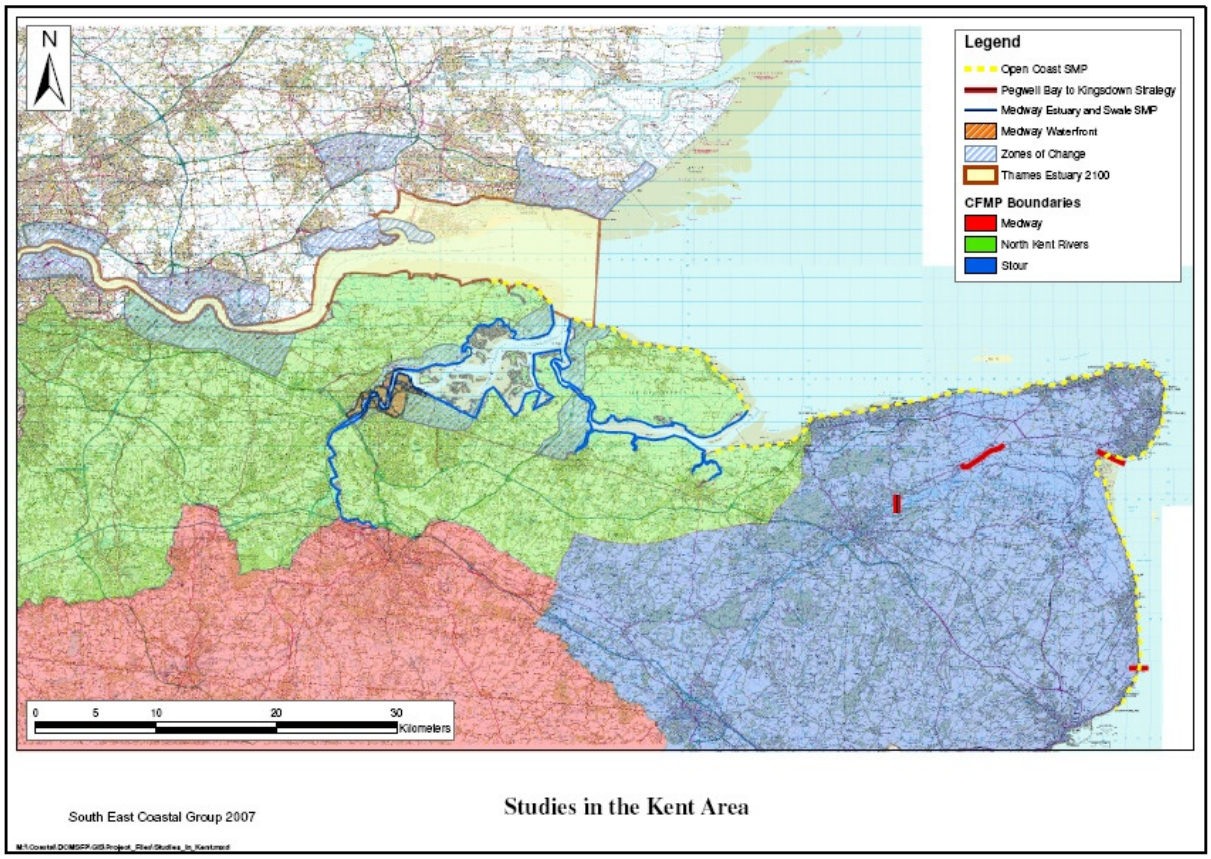

Figure 1.1 North Kent Strategic Flood, Coastal Erosion and Development Plans

Isle of Grain to South Foreland Shoreline Management Plan 2

This SMP covers the open coastline of the English Channel from the Isle of Grain in North Kent around the north of the Isle of Sheppey and then along the coastline of the mainland from Faversham Creek to South Foreland in East Kent. This is the second SMP for this section of coast and is a review of the first plan drafted in 1996. It shares coastal boundaries with the Medway Estuary and Swale SMP and the Thames Estuary 2100 (TE2100) plan around Sheerness, the Isle of Grain, Shell Ness and Faversham. The Isle of Grain to South Foreland SMP2 has been developed in tandem with the Medway Estuary & Swale SMP to ensure consistency of policy and approach.

Thames Estuary 2100 (TE2100) Strategy

The TE2100 covers from the boundaries of the Medway Estuary and Swale SMP at the Isle of Grain up the Thames Estuary and river to Teddington Lock. The Thames Estuary 2100 (TE2100) Project is an Environment Agency initiative to develop a Flood Risk Management Plan for London and the Thames Estuary for the next 100 years.

North Kent Rivers Catchment Flood Management Plan (CFMP)

Catchment Flood Management Plans (CFMPs) provide a similar level of strategic planning as SMP's, identifying long-term, broad policies for sustainable flood risk management within river catchments. These policies will form the basis for development of Strategy Plans, covering all or part of the overall catchment area, which will identify in more detail appropriate flood defence measures. Links between SMPs and CFMPs are important, where for example, a CFMP could identify land drainage/ flood management policies that could compliment or conflict with SMP policies. The North Kent Rivers CFMP covers all of the freshwater streams of North Kent north of the tidal limit of the Medway. This SMP was produced before the CFMP and the SMP policies informed the CFMP Policies. The CFMP was adopted in August 2008.

North Kent Coastal Habitat Management Plan (CHaMP)

Coastal Habitat Management Plans quantify habitat change, (loss and gain), and recommended measures to prevent future losses. The plans also include strategic habitat monitoring programmes to map future changes to be delivered through Shoreline Management Plans (SMP's) and flood and coastal defence strategies and schemes. The North Kent CHaMP, completed in 2002, provides a strategic overview of the consequences of long term predicted shoreline changes for the North Kent area, on designated habitats and species. The approved North Kent CHaMP has informed the development of this SMP.

Greater Thames Estuary Coastal Habitat Management Plan (CHaMP)

The Greater Thames Estuary CHaMP is currently being undertaken and will inform the TE2100 Strategy on the provision of compensatory and replacement habitat. This will review and replace the 2002 North Kent CHaMP. The SMP has taken account of the key findings of the draft Greater Thames Estuary CHaMP. The extent of the Greater Thames Estuary CHaMP is shown in Figure 1.2.

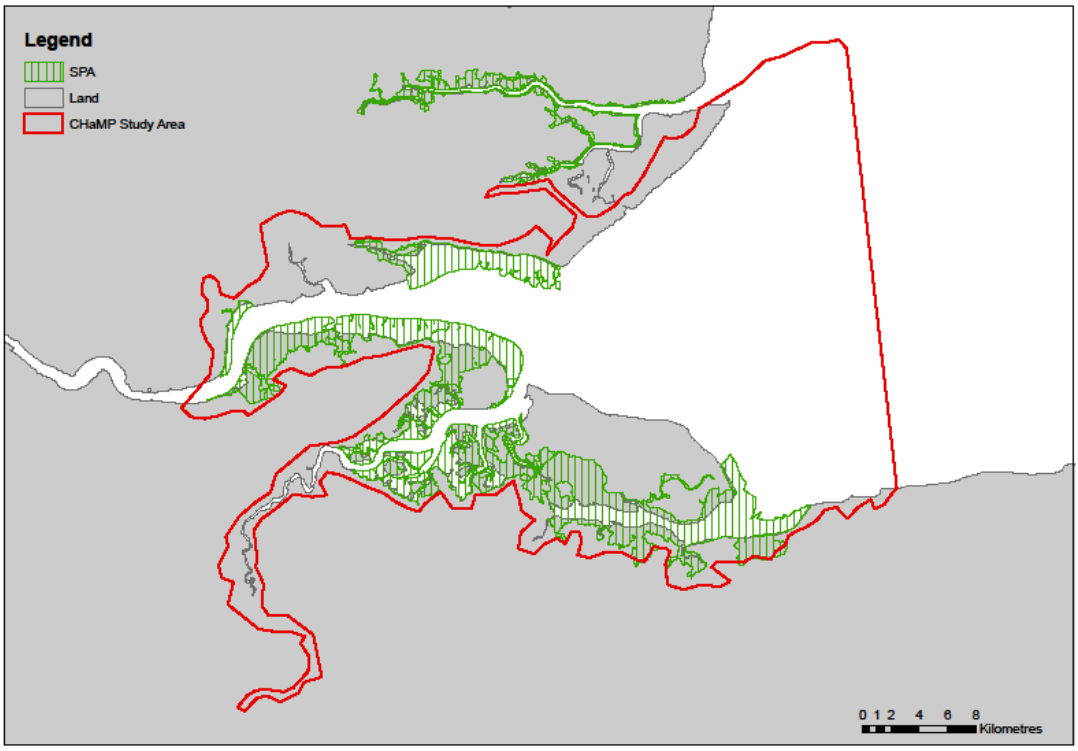

Figure 1.2 Extent of the Greater Thames Estuary CHaMP

Boundaries & Interfaces of the Medway Estuary & Swale Shoreline Management Plan (SMP)

The boundaries of the Medway Estuary & Swale Shoreline Management Plan have been established to link

a) at the fluvial interface with the North Kent Rivers CFMP at the normal tidal limit of the River Medway at Allington Lock.

b) at the mouth of each of the Medway & Swale estuaries at the 'Schedule 4 Boundary' (Coast Protection Act 1949) where the estuary officially meets the sea. This is the common interface of the Medway Estuary & Swale and the Isle of Grain to South Foreland Shoreline Management Plans.

1.1.2 Guiding principles

The SMP is a non-statutory, policy document for coastal defence management planning. It takes account of other existing planning initiatives and legislative requirements, and is intended to inform wider strategic planning[1]. It does not set policy for anything other than coastal defence management.

The SMP promotes management policies for a coastline into the 22nd century, to achieve long-term objectives, while being technically sustainable, environmentally acceptable and economically viable. It is, however, recognised that given the difference between short and long term objectives, changes to management policy in the short term may be unacceptable. Thus the SMP provides a high level, step by step management plan for meeting objectives with appropriate management change i.e. a 'route map' for decision makers to move from the present situation towards a more sustainable future.

The policies that comprise this plan have been defined through the development and review of shoreline management objectives, representing both the immediate and longer term requirements of stakeholders, for all aspects of the coastal environment. Together with a thorough understanding of the coastal and estuarine processes operating on the shorelines of the estuaries, these objectives provide a thorough basis upon which to appraise the benefits and impacts of alternative policies, both locally and plan area wide. In this way, the selection of policy takes equal account of all relevant features in identifying the best sustainable management solutions.

After the first round of SMPs was completed in England and Wales, a review funded by Defra (2001) examined the strengths and weaknesses of various shoreline management plans and hence guidance was issued by Defra in 2003. Three 'pilot' SMPs (Sheringham to Lowestoft, South Foreland to Beachy Head and Beachy Head to Selsey Bill) were used to test Interim Procedural Guidance, lessons learnt from the pilots were fed into the guidance, which was subsequently updated and re-issued in 2006[2].

[1] The planning reforms under the Planning and Compulsory Purchase Act 2004 identify a requirement for Regional Spatial Strategies (regional level statutory planning document) and Local Development Documents (local level statutory planning document). These are required to contribute to the achievement of sustainable development and are supported by a range of government planning policy advice and guidance, in particular Planning Policy Statements (PPSs) and their predecessors Planning Policy Guidance Notes (PPGs). This advice and guidance shapes and directs planning at the regional and local level.

[2] Defra (2006) Shoreline Management plan Guidance. March 2006.

Some of this guidance is targeted at achieving greater consistency in the assessments and presentation of these plans, but there are more fundamental issues that have been identified, which this and other SMPs must address.

One significant issue is the inappropriateness of certain policies which, when tested in more detail with a view to being implemented, may be found to be unacceptable or impossible to justify either economically or technically. It is therefore important that this SMP is realistic, given known legislation and constraints, and does not promise what can not be delivered. There is no value in a long-term plan which has policies that are driven by short-term politics and cannot be justified once implementation is considered several years in the future. Equally, whilst selection of the preferred plan has considered the affordability of each policy, its adoption by the authorities involved does not represent a commitment to fund its implementation. Ultimately, the economic worth of policy implementation must be considered in the context of budgetary constraints (whether private or government funding), and it cannot be guaranteed that budgets will be available for all policies.

Equally, the plan must also remain flexible enough to adapt to changes in legislation, politics and social attitudes. The plan therefore considers objectives, policy setting and management requirements for 3 main epochs; from the present day, medium-term and long-term (corresponding broadly to time periods of 0 to 20 years, 20 to 50 years and 50 to 100 years respectively). There is a need to have a long-term sustainable vision, which may change with time, but should be used to demonstrate that flood and coastal defence decisions made today are not detrimental to the achievement of that vision.

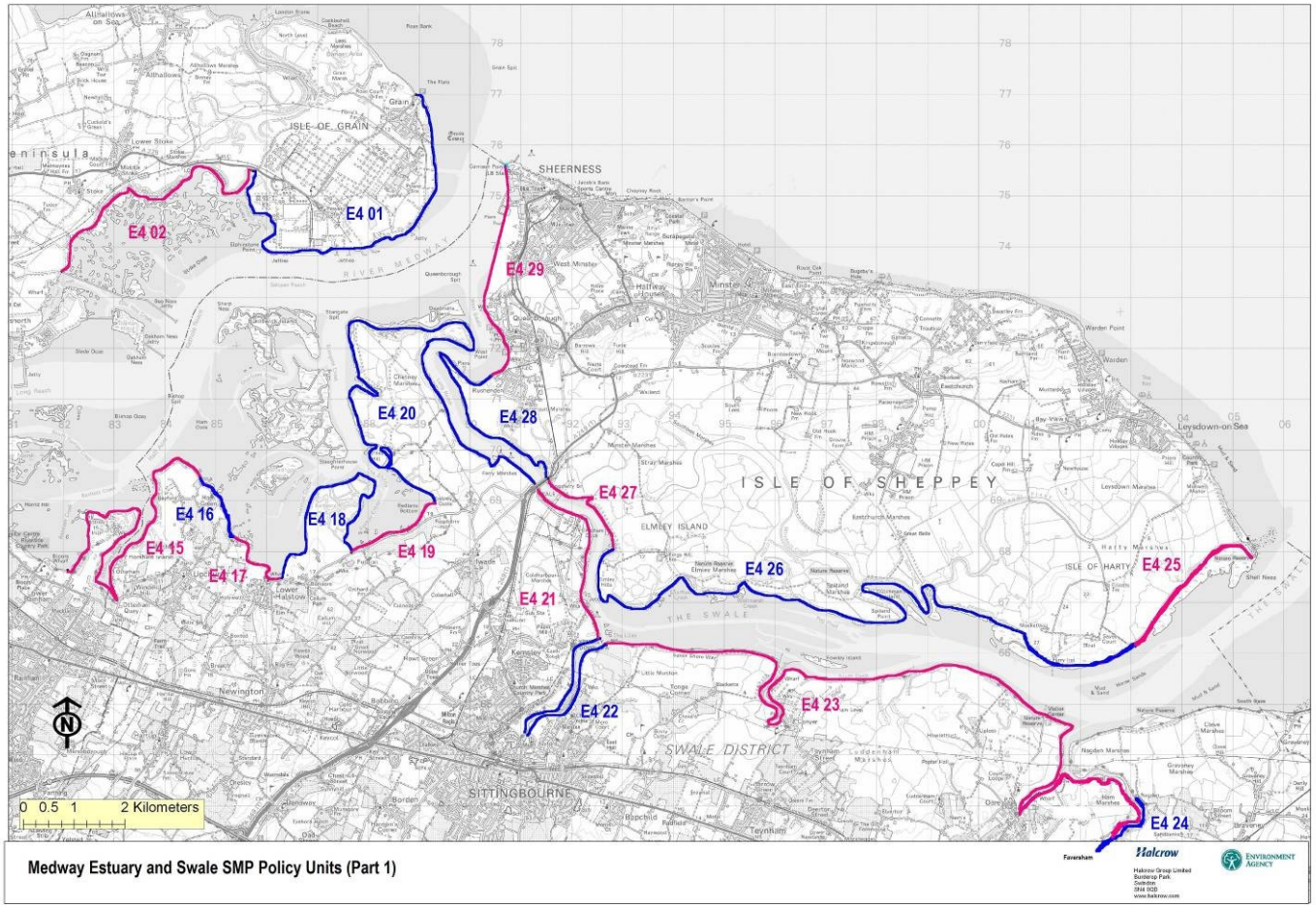

Figure 1.3: Medway Estuary and Swale SMP Policy Units (part 1).

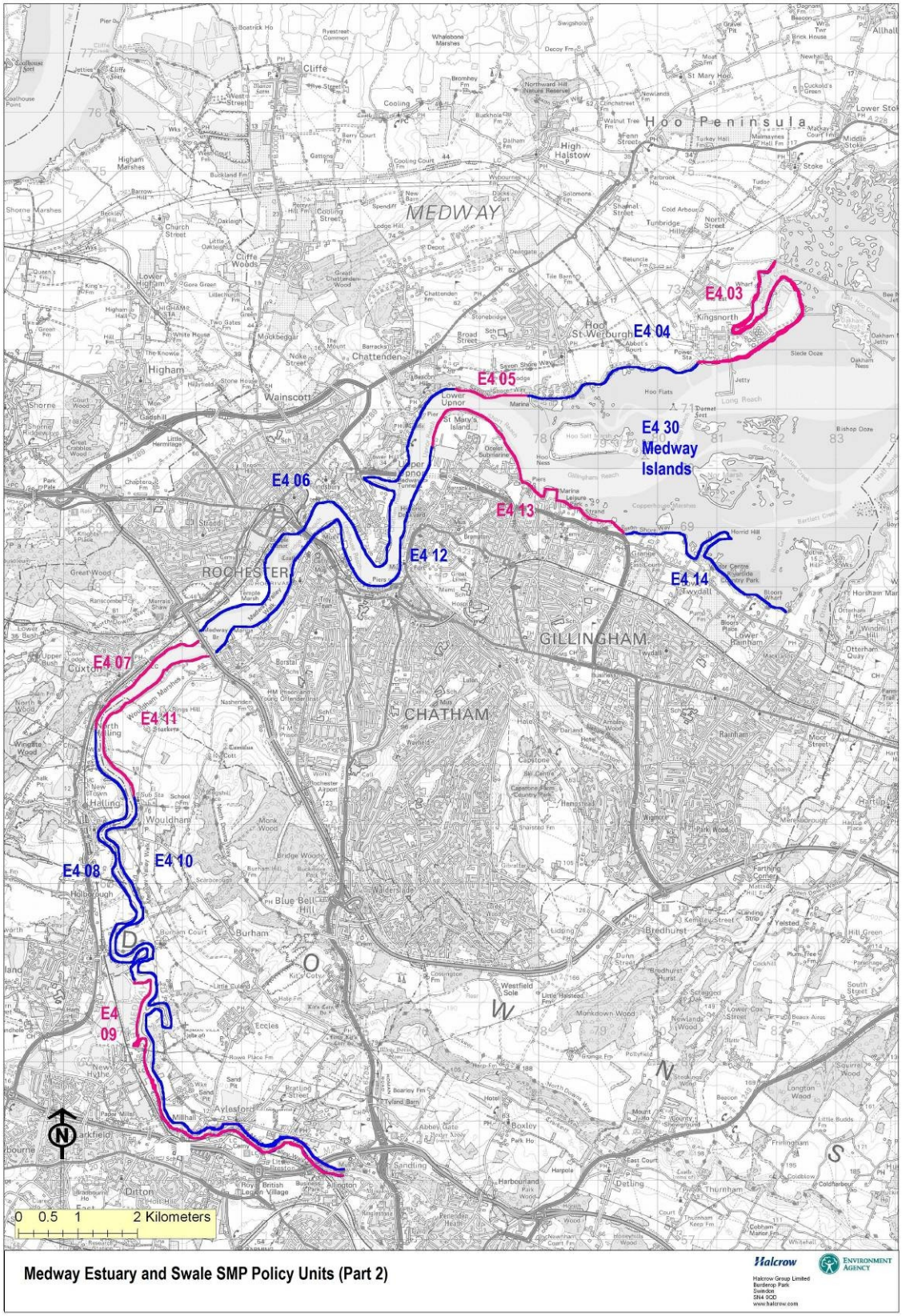

Figure 1.4: Medway Estuary and Swale SMP Policy Units (part 2).

1.1.3 Objectives

The objectives of the SMP are as follows:

- To define, in general terms, the flooding and erosion risks to people and the developed, historic and natural environment within the SMP area over the next century;
- To identify the preferred policies for managing those risks;
- To identify the consequences of implementing the preferred policies;
- To set out procedures for monitoring the effectiveness of the SMP policies;
- To inform planners, developers and others of the risks identified within the SMP and preferred SMP policies when considering future development of the shoreline and land use changes;
- To comply with international and national nature conservation legislation and biodiversity obligations; and,
- To highlight areas where knowledge gaps exist.

1.1.4 The SMP Policies

The shoreline management policies considered are those defined by the Defra (2006) SMP guidance, they are:

Hold the Line	By maintaining or changing the standard of protection;
Advance the Line	By building new defences on the seaward side of the original defences;
Managed Realignment	By allowing the shoreline to move backwards or forwards, with management to control or limit movement; and,
No Active Intervention	Where there is no investment in coastal defences or operations.

The Client Steering Group has, however, also re-defined some policies as '**Managed Realignment with localised Hold the Line**' along some frontages where there is a potential for managed realignment along part(s) of the shoreline. The policy has been re-named to allow for more flexible estuary management in the future and to discourage new development in the area.

1.2 Structure of the SMP

The recommended plan and policies presented in this SMP are the result of numerous studies, assessments and discussions performed over a period of time. To provide clarity for different readerships, the documentation to communicate and support the plan is provided in a number of parts. At the broadest level, these are divided into two:

- The Shoreline Management Plan; and,
- A series of supporting documents presented as appendices to the management plan.

1.2.1 The Shoreline Management Plan

This document provides the management plan for the next 100 years and the policies required for it to be implemented. This is intended for general readership and is the main tool for communicating intentions. Whilst the justification for decisions is presented, it does not provide all of the information behind the recommendations. Further supporting information is contained in the Appendices.

The plan is presented in five parts:

Chapter 1 Gives details on the principles, aims, structure and background to its development.

Chapter 2 Provides details of how the SMP meets the requirements of a Strategic Environmental Assessment (SEA).

Chapter 3 Presents the basis for development of the Plan, describing the concepts of sustainable policy and providing an understanding of the constraints and limitations on adopting certain policies.

Chapter 4 Presents the preferred Plan at high level for the SMP as a whole, discussing the rationale, implications, and requirements to manage change. The shoreline is considered in five broad sections.

Chapter 5 Provides a series of statements for each of the 30 shoreline policy units that detail the location-specific policies proposed to implement the preferred Plan and the local implications of these policies.

Chapter 6 The Action Plan provides a programme for future activities which are required to progress the plan between now and its next review in 5 to 10 years.

Although it is expected that many readers will focus upon the local details in Chapters 4 and 5, it is important to recognise that the SMP is produced for the estuaries as a whole, considering issues beyond specific locations. Therefore, these statements must be read in the context of the wider-scale issues and policy implications, as reported in Chapters 2, 3 and in the Appendices to the Plan.

1.2.2 SMP Supporting Documents and Appendices

The accompanying documents provide all of the information required to support the plan. This is to ensure that there is clarity in the decision-making process and that the rationale behind the policies being promoted is both transparent and auditable. The documents are supported by a Glossary of Terms.

The supporting information is largely of a technical nature and is provided in nine Appendices:

A. SMP Development: This reports the history of development of the SMP, describing more fully the plan and policy decision-making process.

B. Stakeholder Engagement: Stakeholders have had an important role in shaping the plan. All communications from the stakeholder process will be provided here, together with information arising from the consultation process.

C. Baseline Process Understanding: Includes baseline process report, defence assessment, No Active Intervention (NAI) and With Present Management (WPM) assessments and summarises data used in assessments.

D. SEA Environmental Baseline Report (Theme Review): This report identifies and evaluates the environmental features (human, natural, historical and landscape) in terms of their significance and how these need to be accommodated by the SMP.

E. Issues and Objective Evaluation: Provides information on the issues and objectives identified as part of the Plan development, including appraisal of their importance.

F. Initial Policy Appraisal and Scenario Development: Presents the consideration of generic policy options for each frontage, identifying possibly acceptable policies, and their combination into 'scenarios' for testing, together with the process assessment and objective appraisal for each scenario.

G. Preferred Policy Scenario Testing: Presents the policy assessment and appraisal of objective achievement towards definition of the Preferred Plan (as presented in the Shoreline Management Plan document).

H. Economic Appraisal and Sensitivity Testing: Presents the economic analysis and sensitivity testing undertaken in support of the Preferred Plan.

I. Metadatabase and Bibliographic database: All supporting information used to develop the SMP is referenced for future examination and retrieval.

J. Habitats Regulations Assessment: Presents the assessment of the effects of the policies on European sites.

K. Strategic Environmental Assessment (SEA): Presents the SEA process carried out for the SMP.

L. Water Framework Compliance: Presents a retrospective Water Framework Directive Assessment.

1.3 The Plan Development Process

1.3.1 Development of the SMP

The development of the Medway Estuary and Swale Shoreline Management Plan has taken account of:

- Latest studies (e.g. Futurecoast (Defra 2002): a geomorphology-based project, which focused upon providing an improved understanding of larger-scale coastal behaviour in the UK; North Kent Coastal Habitat Plan (CHaMP) (Posford Haskoning, 2002) and Environment Agency Indicative Flood Mapping[3];
- Issues identified by most recent defence planning (i.e. the Isle of Sheppey Coastal Defence Strategies);
- The results of coastal monitoring activities;
- recent changes in legislation (e.g. the requirement for an Appropriate Assessment to be carried out under the EU Habitat Directives); and,
- Changes in national defence planning requirements (e.g. the need to consider 100 year timescales in future planning as opposed to the 50 year timescale of the original SMPs, modifications to economic evaluation criteria etc.).

Reviews of the SMP are anticipated to be carried out on a 5 to 10 year basis, although this timing will be driven by the availability of new information and advances in the understanding of the estuaries.

[3] Environment Agency Indicative Floodplain 2005.

1.3.2 Production of the 2006 SMP

Development of this SMP has been led by a Client Steering Group (CSG) comprising relevant members of the South East Coastal Group. These include technical officers and representatives from Kent County Council, Swale Borough Council, Medway Council, Tonbridge and Malling Council, Canterbury City Council, the Environment Agency, Natural England and English Heritage. The Client Steering Group also included a representative from Herrington Consultants. Several others were invited but were unable to attend meetings.

The SMP process has involved approximately 60 stakeholder organisations at key decision points, through formation of a Key Stakeholder Forum (KSF). Meetings with the KSF have been held to help identify and understand the issues, to review the objectives and set direction for appropriate management scenarios. The stakeholders also reviewed and commented on the preferred plan policies.

SMP development has also been assisted by regular involvement of members representing each of the operating authorities (the councils and the Environment Agency), through an Elected Members Forum (EMF). This group comprised elected members from each of the councils, Medway District Council, Swale Borough Council, Tonbridge and Malling Borough Council and Kent County Council (generally the relevant Cabinet Portfolio holder) and a representative from the Regional Flood Defence Committee. The EMF members have attended meetings with a remit from their organisation to 'inform and comment on' the developing stages of the SMP thereby providing some degree of input into policy development, by those who will ultimately be adopting the policies. The EMF has met at the same stages as the KSF, providing a review and informal approval of development and outputs (including matters arising from KSF discussions).

The SMP is based upon information largely gathered between December 2005 and April 2006, provided by numerous parties contacted during this period. This included contact with approximately 270 identified consultees. This was followed up with information interpretation and further meetings with the key stakeholders, elected members and the steering group committee.

The main activities in producing the SMP include:

- Development and analysis of issues and objectives for various locations, assets and themes, including meetings with the Key Stakeholders and Elected Members;
- Strategic Environmental Assessment (SEA) including an SEA Environmental Baseline Report (Theme Review), reporting upon human, historic and natural environmental features and issues, evaluating these to determine the relative importance of objectives;
- SEA Report detailing the SEA of the preferred SMP;
- Analysis of the impact of coastal processes and coastal evolution for baseline cases of not defending and continuing to defend the coastline as at present;
- Agreement of objectives with the Key Stakeholders and Elected Members, to determine possible policy scenarios;
- Development of policy scenarios based on key objectives and primary drivers (agreed with the Key Stakeholders and approved by the Elected Members) for sections of the frontage;
- Examination of estuarine and coastal evolution in response to these scenarios and assessment of the implications for the human, historic and natural environment;
- Determination of the preferred plan and policies through review with the Key Stakeholders and Elected Members, prior to compiling the SMP document;
- Consultation on the proposed plan (including SEA) and policies;

- Finalisation of the SMP following consultation; and,
- Adoption of the SMP by Local Authorities, Natural England and the Environment Agency.

The diagram in Figure 1.5 illustrates the SMP process up to and including Public Consultation.

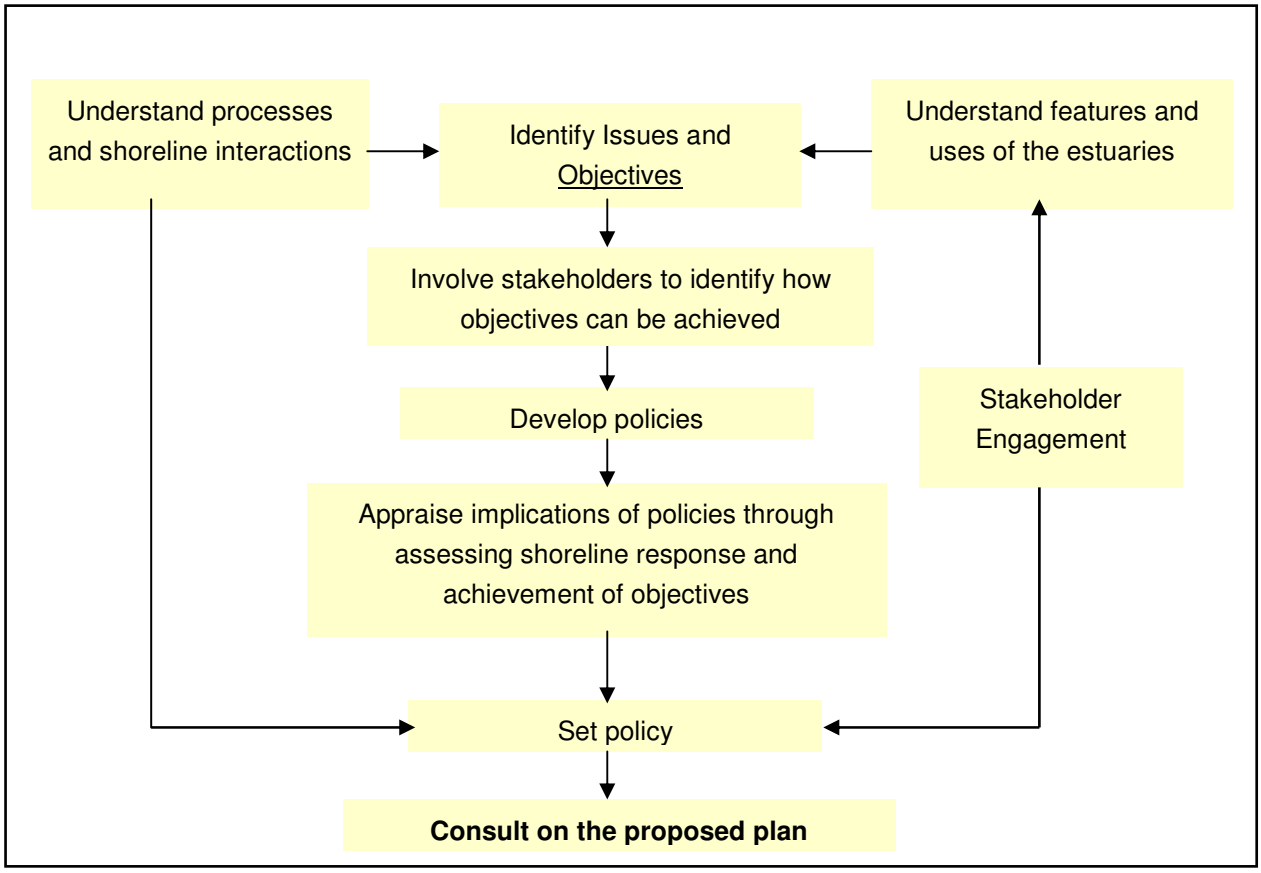
Understand processes and shoreline interactions
Identify Issues and Objectives
Understand features and uses of the estuaries
Involve stakeholders to identify how objectives can be achieved
Develop policies
Stakeholder Engagement
Appraise implications of policies through assessing shoreline response and achievement of objectives
Set policy
Consult on the proposed plan

Figure 1.5: A diagrammatic summary of the SMP process. (Adapted from Defra, 2006)

2 STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

2.1 SEA Background

Strategic Environmental Assessment (SEA) is the systematic appraisal of the potential environmental consequences of high level decision-making, such as policies, plans, strategies and programmes, before they are approved. The purpose of SEA is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes, with a view to promoting sustainable development.

Directive 2001/42/EC of the European Parliament and of the Council, and the associated Environmental Assessment of Plans and Programmes Regulations 2004, requires that a Strategic Environmental Assessment (SEA) be carried out by certain plans and programmes that are required by legislative, regulatory or administrative provisions. The Directive is intended to ensure that environmental considerations (both good and bad) are taken into account alongside other economic and social considerations in the development of relevant plans and programmes. Whilst it has been determined that SMPs are not required by legislative, regulatory or administrative provisions, they do set a framework for future development and have much in common with the kind of plans and programmes for which the Directive is designed. Therefore, Defra has recommended that environmental appraisal of the SMPs be undertaken in line with the approach of the Directive.

In developing the Medway Estuary and Swale SMP, the environment has been considered alongside social, technical and economic issues. An SEA Environmental Baseline Report (Theme Review) **Appendix D** has been prepared to describe the environmental baseline characteristics of the SMP area and to summarise the scoping process.

The SEA Report in **Appendix K** documents the SEA process for the Medway Estuary and Swale SMP and identifies how the plan achieves the requirements of the 2004 Regulations. The text is sub-divided into sections representing the key requirements of the Regulations, and identifies the sections of the SMP documentation in which the relevant information is presented.

This chapter summarises the key elements of the SEA process and the environmental impacts of the preferred plan.

A signposting table (Table 2.1) has also been included, which details the SEA requirements and where this information can be located within the SMP documents.

Table 2.1: SEA signposting table

Environmental Report Requirements	Location of information within SMP Report
(a) an outline of the: • contents; • main objectives of the plan or programme; and, • relationship with other relevant plans and programmes;	 **Main Document** - Section 1.2 **Main Document** – Sections 1.1.3 **Main Document** – Section 1.1.1 & 3.2.3
(b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;	**Main Document** – Section 2.4 **Appendix C – Baseline Process Understanding**: Section C1 – Assessment of Estuary Dynamics Section C3 – Baseline Scenario 1: No Active Intervention Section C5 – Supporting Information
(c) the environmental characteristics of areas likely to be significantly affected;	**Appendix D – SEA Environmental Baseline Report (Theme Review)** Section D2 – Natural Environment Section D3 – Landscape and Character Section D4 – Historic Environment
(d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;	**Appendix D – SEA Environmental Baseline Report (Theme Review)** Section D2 – Natural Environment **Appendix J – Habitats Regulations Assessment**
(e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;	**Main Document** – Section 2.5 **Appendix E – Issues and Objectives Evaluation** **Appendix G – Scenario Testing** Section G3 – Objective Appraisal **Appendix J – Habitats Regulations Assessment**
(f) the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;	**Main Document** – Section 2.7 **Main Document** – Section 4.2 **Appendix K - SEA** **Appendix J – Habitats Regulations Assessment**

Environmental Report Requirements	Location of information within SMP Report
(g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;	**Main Document** – Section 6 Action Plan **Appendix K - SEA** **Appendix J – Habitats Regulations Assessment**
(h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	**Main Document** Section 4 – Overview of the Shoreline Management Plan Section 5 – Policy Statements **Appendix G** Section 12 - Preferred Option
(i) a description of the measures envisaged concerning monitoring in accordance with Article 10;	**Main Document** – Section 6 Action Plan **Appendix K - SEA**
(j) a non-technical summary of the information provided under the above headings.	**Main Document** – Section 2 Environmental Assessment **Appendix K - SEA**

2.2 The Appraisal Process

A Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. The SMP is a non-statutory, policy document for flood and erosion risk management planning. It takes account of other existing planning initiatives and legislative requirements, and is intended to inform wider strategic planning. It does not set policy for anything other than coastal defence management.

Full details on the background to the SMP and the appraisal process are set out in Chapters 1 and 2, with the exact details of the procedure followed in development of the Plan set out in **Appendix A**.

2.3 Stakeholder Engagement

Stakeholders have been involved in the SMP appraisal process, through the formation of a Key Stakeholders Forum (KSF) and an Elected Members Forum (EMF), which is one of the key changes from the first round of SMPs. This involvement has:

- Been undertaken throughout development of the SMP;
- Given stakeholders an opportunity to comment on the environmental appraisal of options; and,
- Allowed representations made by the stakeholders and the public to be taken into account in the selection of policy options.

The KSF includes representatives from interests including local authorities, nature conservation, industry and heritage. This group has met periodically throughout the SMP development process to input information and review outputs as the study progressed. The EMF comprises a representative from each of the local authorities and the Environment Agency, attending with a remit to agree the

various stages of the SMP as it progresses. Again, this group has met throughout the plan development, agreeing to the outputs once they have been discussed with the KSF.

In this way, the views of those whom the SMP policies will affect are involved in its development, ensuring that all relevant issues are considered, and all interests represented. The interests of landowners and residents have been represented through the involvement of Elected Members, and the views of all stakeholders are now sought through the present consultation process on the recommended policies.

Full details of all stages of stakeholder engagement undertaken during development of the draft Plan are presented in **Appendix B**. This includes the copies of briefing materials and records of stakeholder inputs.

2.4 The Existing Environment

The shorelines of the Medway and Swale estuaries, covered by this plan, are diverse in their physical form, human usage and natural environment. This includes:

- The major industrial and commercial areas along the shoreline of the constrained channel in the outer Medway estuary;
- The wide middle Medway estuary with extensive saltmarsh islands and mudflats and extensive areas of reclaimed freshwater habitats behind defences;
- The large urban areas of the Medway Towns;
- The narrow meandering channel of the inner Medway estuary;
- The extensive floodplains bordering the Swale estuary; and,
- Many areas designated and protected for their heritage, landscape and environmental value.

The current state of the environment is described in the SEA Environmental Report ('Theme Review'), presented in **Appendix D** to this report. This identifies the key features of the natural and human environment of the shoreline, including commentary on the characteristics, status, relevant designations, and commentary related to the importance of the features and the 'benefits' they provide to the wider community. The benefits assessment is provided in support of the definition of objectives (see **Section 2.5**).

In addition to the review of the natural and human environment, the extent and nature of existing coastal defence structures and management practices are presented in the 'Defence Report' in **Appendix C**.

This is supplemented by the 'Assessment of Estuary Dynamics' baseline report, in **Appendix C**, which identifies the contemporary physical form of the estuaries and the processes operating upon them.

The assessment summarised previous workers' findings relating to the future evolution of the two estuaries and builds on this understanding by further analysing the geomorphological form of the estuaries and comparing it with historical changes in saltmarsh area. It should be noted that there is some uncertainty regarding the predictions made by previous workers in terms of saltmarsh expansion and sediment supply. It is therefore recommended that the uncertainty in the predicted expansion of saltmarshes in the future could be reduced by undertaking further studies. This would help inform and reduce uncertainty in future revisions of the SMP.

2.5 Environmental Objectives

An integral part of the SMP development process has been the identification of issues and definition of objectives for future management of the shoreline. This was based upon an understanding of the existing environment (**Section 2.4**), the aspirations of Stakeholders (**Section 2.3**), and an understanding of the likely evolution of the shoreline under a hypothetical scenario of 'No Active Intervention' (**Appendix C**), which identifies the likely physical evolution of the estuaries without any future defence management and hence potential risks to shoreline features.

These objectives include all relevant plans, policies, etc associated with the existing management framework, including all identified opportunities for environmental enhancements.

The definition and appraisal of objectives has formed the focus of engagement with stakeholders during development of the SMP (as identified in **Appendix B**). The full list of issues and objectives defined for this SMP are presented in **Appendix E**, which is supplemented by background information provided in the SEA Environmental Baseline Report (**Appendix D**).

Appendix G includes consideration of how the objective, and hence the 'environment', would be affected under the 'No Active Intervention' scenario, also their achievement under the policy options considered feasible for that frontage, with consideration of international and national designations obligations and biodiversity. **Chapter** 5 of this document also details consideration of the potential environmental effects of the preferred policies.

2.6 Identification and Review of Alternative Policy Scenarios

As identified in **Chapter 1**, the SMP considers four generic policies for shoreline management. **Appendix F** presents the results of the initial consideration of these policies to define 'policy scenarios'. This identifies those options taken forward for detailed consideration, and identifies why the alternatives have not been considered.

The 'policy scenarios' defined, have then been appraised to assess the likely future evolution of the shoreline, from which the environmental impacts can be identified. The process appraisal of these scenarios is presented in **Appendix G**. The results of this evolution, in terms of risks to coastal features, are then used to appraise the achievement of objectives for each scenario. This is reported in the issues and objectives table in **Appendix G**.

Annex 1 of **Appendix K** presents the environmental assessment of the alternative SMP policy options on SEA receptors.

2.7 Environmental Effects of the Preferred Plan

The environmental effects of the preferred plan on the SEA receptors, is presented in **Annex 2** of the SEA Report (**Appendix K**).

Based upon the outputs from the testing of policy scenarios (**Appendix G**), the preferred plan has been defined. This is reported for the whole SMP frontage in **Chapter 4**, with specific details for each Policy Unit presented in **Chapter 5**.

Chapter 4 includes the 'Plan for Balanced Sustainability' (**Section 4.1**) defining the broad environmental impacts of the plan, based upon the appraisal of objectives. This chapter also presents the 'Predicted Implications of the Preferred Plan' (**Section 4.2**) under thematic headings.

The thirty individual Policy Units in **Chapter 5** each present the Preferred Plan for the Unit identifying the justification, and then presents the policies to achieve the Plan over the 100 year period, presenting the detailed implications of the policies and identifying any mitigation measures that would be required in order to implement the policy.

2.8 Monitoring and Further Study Requirements

The preferred policies are considered to be viable, based on the assessment of best available information, however, further research will be required to fully inform the details of their delivery and address uncertainties. Where the preferred plan for any Policy Unit has specific monitoring or detailed study requirements to help clarify uncertainties, this is identified in the relevant 'Policy Unit Statement' (**Chapter 5**).

Implementation of the SMP and compliance with the Habitats Regulations Assessment (**Appendix J**) relies on the supply of increasingly detailed and robust information from the geomorphological and ecological studies cited in the Action Plan (**Section 6**).

For managed realignment policies, geomorphological studies will provide data to inform the design and fully assess the best manage the physical effect and benefit of the policies. Ecological studies will provide data to inform how the integrity of designated wildlife (SSSI, Natura 2000) sites will be best managed through the scale and location of managed realignment. Impacts will be mitigated through the choice of appropriate managed realignment lines, through design of flood defences including selection of suitable materials and finish, as well as through continued consultation with statutory consultees (e.g. Natural England and English Heritage) and other specialists.

At this level of appraisal, environmental sources of uncertainty such as buried archaeology and unknown ground conditions or contamination have been dealt with through desk study only. There is therefore some risk that closer inspection to inform the development of strategies and schemes may identify constraints that may change approaches to flood management at particular localities.

In addition, in carrying out the SEA, solutions that are environmentally justifiable have been selected based on existing data sources and baseline data. The assessment of cumulative impacts is therefore limited by changing environmental characteristics and future development.

Detailed monitoring and mitigation requirements will be investigated in detail as part of, or in preparation for, future strategy studies and schemes.

Future monitoring and investigations required to address the limitations of the SMP are detailed in the SMP Action Plan (**Section 6** - developed following Public Consultation).

In addition, where a proposed policy may result in the loss of heritage features (known and unknown) it will also be important to consider an appropriate programme of survey, recording and investigation to record these important sites, and those potential features not yet identified.

The Action Plan also identifies estuary wide studies that will be required to inform the policies (see **Section 6.2**). These studies will be undertaken to inform further studies identified in both the Medway Estuary and Swale SMP and the Isle of Grain to South Foreland SMP2.

Particular requirements relate to further (or ongoing studies) at the following locations in Table 2.2:

Table 2.2: Monitoring and further study requirements for policy units.

Policy Unit		Requirements
E4 02	Colemouth Creek to Bee Ness Jetty	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 04	Power Station to Cockham Wood	Further studies to investigate Managed Realignment i.e. the flood risk consequences of undertaking managed realignment; future morphology of the estuary define the standard and alignment of defences and details of policy delivery.
E4 05	Cockham Wood	Monitoring to examine present and future shoreline evolution under a policy of No Active Intervention.
E4 08	North Halling to Snodland	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the combined effect of multiple realignments between Medway Bridge and Allington Lock; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 09	Snodland to Allington Lock	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the combined effect of multiple realignments between Medway Bridge and Allington Lock; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 10	Allington Lock to North Wouldham	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the combined effect of multiple realignments between Medway Bridge and Allington Lock; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 11	Wouldham Marshes	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 14	The Strand to West Motney Hill	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; potential contamination; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 15	Motney Hill to Ham Green	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 16	Ham green to East of Upchurch	Monitoring to examine present and future shoreline evolution under a policy of No Active Intervention.
E4 17	East of Upchurch to East Lower Halstow	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 18	Barksore Marshes	Further studies to investigate Managed Realignment and No

Policy Unit		Requirements
		Active Intervention i.e. future morphology of the estuary; potential contamination; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of delivery under Managed Realignment. Monitoring to examine present and future shoreline evolution under a policy of No Active Intervention.
E4 19	Funton to Raspberry Hill	Monitoring to examine present and future shoreline evolution under a policy of No Active Intervention.
E4 20	Chetney Marshes	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 22	Milton Creek	Further studies to consider the impact of groundwater extraction on the policy of hold the line.
E4 23	Murston Pits to Faversham Creek	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 25	Shell Ness to Sayes Court	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 26	Sayes Court to North Elmley Island	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 27	North Elmley Island to Knigsferry Bridge	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 28	Kingsferry Bridge to Rushenden	Further studies to investigate Managed Realignment i.e. future morphology of the estuary; potential contamination; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery.
E4 30	Medway Islands	Monitoring to examine present and future evolution of island habitats under a policy of No Active Intervention.

2.9 Habitats Regulations (Appropriate) Assessment

Regulation 48 of the Habitats Directive (92/43/EEC) requires that an Appropriate Assessment is undertaken for plans or projects that will have a significant effect on a European site (e.g. sites designated as SPA or SAC), where the plan is not directly associated with the management of the site. The Habitats Regulations Assessment (**Appendix J**) assesses the implications of the plan on these sites in order to identify the no damage or, if unavoidable, the least damage solution in respect of the conservation objectives of the European site's affected by this plan. The Thames, Medway and Swale Estuaries contain a significant coverage of European sites on both sides of the shoreline and

the Habitats Regulations Assessment generated many actions within the Action plan and places key constraints on how the SMP will be implemented.

2.10 Water Framework Compliance

A Water Framework Directive (WFD) assessment is provided in **Appendix L 'Water Framework Compliance'** of the SMP. This WFD-related assessment takes into consideration the potential effects of SMP policy options on the ecological quality elements of the water bodies directly affected by the SMP. The potential effects on ecological quality elements are associated with changes in hydrological regimes and water body morphology – including such factors as changes in current velocities, sediment accretion/erosion, water quality (turbidity, salinity) and tidal inundation. The WFD-related assessment also considers whether the SMP policies may have adverse consequences for water bodies protected under other EU legislation, in particular SPAs and SACs.

3 BASIS FOR DEVELOPMENT OF THE PLAN

3.1 Historical Perspective

The contemporary forms of both the Medway and Swale estuaries have been significantly influenced by anthropogenic activity over hundreds of years. The enclosure of former saltmarsh areas by construction of defences has taken place periodically since the Roman times. This has led to the existence of extensive areas of reclaimed land along much of the Medway and Swale shorelines. Land reclamation has led to a corresponding decrease in tidal prism and consequently both estuaries are experiencing contemporary net accretion overall, although erosion occurs in some locations.

The degree of future geomorphological change within the estuaries will be dependant on a change in driving forces such as sea level rise, storminess, increases in fresh water flows and the ability of the system to respond to these drivers. The ability of the system to respond therefore is in turn limited by constraints such as the underlying geology, available sediment supply and sea defences (i.e. position and standard of protection).

Although overall the estuaries are accreting at present, future increases in the rate of sea level rise and degree of storminess, coupled with the limited availability of sediments, mean that this accretion is likely to give way to erosion. The decision to be made now is how we are going to manage this change in the future.

3.2 Sustainable Policy

3.2.1 Coastal Processes and Coastal Defence

Climate Change

The coastline is undergoing constant change due to large scale impacts of climate change, namely sea level rise, through to the day-to-day effects of waves and tidal currents. It is the implications of climate change that will determine sustainable shoreline management into the future.

Much of the present shoreline of the southern North Sea and the English Channel has been shaped by sea level rise during the Holocene period, i.e. following the last glaciation. Flooding of the southern North Sea and the English Channel commenced as sea levels rose. By approximately 8,000 years ago the entire English Channel, including the Dover Straits, was inundated. Shortly after, the shallow land separating this water body from the southern North Sea was breached, initiating a strong eastward current and sediment transportation in the eastern channel.

Sea level attained a level close to its present position around 5,000 years ago, and the modern hydrodynamic regime has been operating since this time. In the early stages of this period, the onshore migration of significant quantities of sediment led to major episodes of coarse sediment accumulation. This resulted in the formation of shingle barriers, that, rolled back to form the present shoreline and many of the present beaches. After sea level reached its present position, mudflats and saltmarsh began to form around the peripheries of estuary systems. These areas were later reclaimed by man for agricultural and industrial purposes.

Over the last 2,000 years sea level rise has continued, but at much lower rates resulting in ongoing, but less dramatic, changes at the shoreline. However, we are now entering a period of accelerating sea level rise, which will result in changes to the present coastal systems. Defra (2002) predicted that

sea level rise would increase from the present rate of 2mm/yr to 6mm/yr by 2105. Following the Third Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) the figures have been revised (2006). The new allowances are highlighted below.

Table 3.1: Updated sea level rise predictions (Source: Defra, 2006)[4]

Administrative or Devolved Region	Assumed vertical land movement (mm/yr)	Net Sea Level Rise (mm/yr)				Previous allowances
		1990-2025	2025-2055	2055-2085	2085-2115	
SE England	-0.8	4.0	8.5	12.0	15.0	6 mm/yr constant *
* Updated figures now reflect an exponential curve and replace the previous straight line graph						

Recent climate studies have indicated that there are significant changes occurring within our climate; with bigger storms, increasing rainfall and rising sea levels. The amount of physical change depends on the degree of exposure of each length of shoreline and the underlying geology. Increasing rainfall in-between longer periods of dryer weather can lead to increased fluvial flows in catchments and consequently increased potential for erosion of intertidal areas and pressure on defences within estuaries.

It is extremely important that the long-term plan in the SMP recognises these future issues and reflects likely future constraints to management planning. Thus the SMP acts as an early warning to those other plans and initiatives that are vital to the communities and infrastructure within the coastal / estuary zones.

Changes at the coast

The reclamation of extensive areas of former coastal lowland for agriculture and development has produced many areas where the shoreline is today artificially seaward of its natural position. Human intervention to construct embankments and drain the backing land for agricultural production, has created the large low lying areas of Grain marshes, Barksore Marshes, Chetney Marshes and marshes on the both the southern and northern banks of the Swale. Under natural circumstances these coastal frontages would have been inter-tidal or tidal habitats, were it not for the man made defences that now protect areas of freshwater and terrestrial habitats.

Sediment movement

Beaches, saltmarshes and low lying coastal floodplains provide a natural form of defence that react to storm waves; they do not prevent further erosion or flooding but do help to limit and control the rate and extent at which this takes place. They also form environmentally important habitats. On a naturally

[4] Defra, 2006. Flood and Coastal Defence Appraisal Guidance, FCDPAG3 Economic Appraisal, Supplementary Note to Operating Authorities – Climate Change Impacts, October 2006.

functioning coastline, the alongshore movement of sediment eroded from cliffs or transported onshore from offshore, provides beaches and estuaries with material locally and further afield. A sustainable shoreline sediment system is one that is allowed to behave dynamically without any alongshore and cross-shore disruption due to coastal erosion and flood risk management.

However, defences constructed to protect developments and agricultural land along the SMP frontage have resulted in only limited sections of the shoreline being free to erode, providing little material to the estuary system. The most significant source of sediment to the Medway and Swale estuaries is the offshore supply of fine suspended material from the Greater Thames Embayment. Potential supplies also include relict sediments contained within saltmarshes, alluvium and sediment from London Clay cliffs within the estuary and along the open coast on the northern coastline of Isle of Sheppey. Previous work has assessed that sediment supply within the Medway estuary is expected to be sufficient to meet demand over the next 50 years but will be insufficient within 100 years and sediment supply within the Swale is expected to be sufficient to meet demand over the next 100 years[5].

The extent of current defence structures means that significant lengths of the study shoreline today are generally in an 'unnatural' form and position. As such, much of the frontage would not necessarily revert to the 'natural' shoreline if we simply allowed defences to fail. Indeed, it is likely that for much of the SMP frontage, the removal or failure of defences would result in erosion and flooding of the backing land. On the large lengths of shoreline backed by low lying land this would cause inundation of the flood plain, creating a new shoreline and habitat in the process along the landward edge of the low lying area.

Defence impacts

Through the development of SMPs and strategy studies, there is often a public misconception that shoreline change can and should be halted though engineering works. There is often a demand to continue to hold the existing defence line to protect assets, but this is coupled with an expectation that the shoreline will continue to look exactly as it does now. However, the dynamic nature of our coasts and estuaries, mean that these expectations are incorrect in many, if not all, instances.

If we choose to continue to defend our shorelines in the same locations that we do at present, then the size of the defences will need to alter considerably. Defences will need to be wider to remain stable against bigger waves around the estuary mouths, have deeper foundations to cope with undermining and narrowing of intertidal areas, and be greater in height to limit the amount of water passing over the top of them in storms. Maintaining current defence lines within the estuary will also result in increased instances of coastal squeeze as sea levels rise. With high rates of sea level rise and low rates of sediment supply intertidal saltmarsh and mudflat habitats may suffer erosion where defences or high land constrain the landward movement of the shoreline. This is likely to lead to increased levels of wave and tidal energy impinging on defences, which will make them more expensive to maintain.

[5] Centre for Coastal Management (CCM), 2002. *Saltmarsh Change within North Kent estuaries between 1961, 1972, 1988 and 2000.* Report produced by CCM at the University of Newcastle.

It must be recognised that, in the very long term, continuing to defend such long stretches of shoreline with increasing exposure and vulnerability may become technically and economically unsustainable. There is also greater risk associated with holding the line and continuing to occupy and develop the backing hinterland. Should inundation take place during an extreme event for example, where assets and lives are at risk, the need to relocate, or mitigate, for the increased risk to assets, should be considered in the future. Even where this point is considered to fall outside the SMP timescale (i.e. beyond 100 years), it is still very important to recognise that maintaining current alignments will not be possible indefinitely.

3.2.2 Economic sustainability

One of the difficulties facing us as a nation is the cost of continuing to protect shorelines to the extent that we do at present. Many of the defences that exist today have been the result of reactive management without consideration of the long-term consequences, including financial commitment.

Studies over the past few years have established that the cost of maintaining all existing defences is already likely to be at least 50% more than present expenditure levels. In simple terms this means that either more money needs to be invested in coastal defence, or defence expenditure has to be prioritised. Whilst it is more than likely that the first option would clearly be the preference of those living or owning land along the coast, this has to be put into context of how the general UK taxpayer wishes to see their money used. Given that the cost to provide defences that are both effective and stable currently averages between £3million and £5million per kilometre[6], the number of privately owned properties that can be protected for this investment has to be weighed up against how else that money can be used, for example education, health and other social benefits.

Furthermore, because of the climate changes being predicted, these recent studies have also established that the equivalent cost of providing a defence will increase during the next century to between 2 and 4 times the present cost, excluding inflation or other factors, i.e. in excess of £6million to £10million per kilometre. Consequently those areas where the UK taxpayer is prepared to continue to fund defence may well become even more selective and the threshold when an area is no longer defended could well shift. Whilst it is not known how attitudes might change, it is not unreasonable to assume that future policy-makers will be more inclined to resist investing considerable sums in protecting property in high risk areas, such as the coast, if there are substantially cheaper options, such as constructing new properties further inland.

It is extremely important that the long-term policies in the SMP recognise these future issues and reflect likely future constraints. Failure to do so would not ensure future protection; rather it would give a false impression of a future shoreline management scenario that could not be justified and would fail to be implemented once funding was sought.

The implications of these national financial constraints are that protection is most likely to be focussed upon areas where there are large amounts of assets potentially at flooding or erosion risk, where the highest level of benefit would be achieved for the investment made, i.e. more properties could be protected per pound of investment. The consequence is that rural communities will often be more

[6] Defra (2001) National Appraisal of Assets at Risk, from flooding and coastal erosion, including the potential impact of climate change.

affected, but from a national funding perspective, i.e. best use of the taxpayer's money, this makes economic sense.

It should be noted that, although the economic viability of the proposed policies has been assessed in this SMP, a proposed policy of Hold the Line or Managed Realignment does not guarantee funding for defence maintenance and / or capital works along these sections of the shoreline.

3.2.3 Environmental sustainability

Environmental sustainability is a concept that is frequently debated. As it depends upon social attitudes, which are constantly changing, it is therefore difficult to define. In the purest sense, however, environmental sustainability allows habitats to be self perpetuating.

Historically, communities at risk from coastal erosion relocated, recognising that they were unable to resist change. However, in more recent times, many coastal defences have been built without regard for the impacts upon the natural environment. Today, because we have better technology, we are less prepared to accept change, in the belief that we can resist nature. Inevitably attitudes will continue to alter; analyses of possible 'futures' are already taking place (e.g. Foresight Future Flooding, 2004 and 'Making Space for Water'[7]), considering the implications for many aspects of life, including approaches to flooding and erosion under different scenarios. It is not possible to predict how attitudes will change in the future; therefore the SMP is based upon existing criteria and constraints, whilst recognising that these may alter over time to accommodate changing social attitudes. Some key uncertainties have been investigated in the Sensitivity Analysis (**Appendix H**).

Quality of life depends on both the natural environment and the human environment, which are discussed below.

Natural Environment

The forces of nature have created a variety of landforms and habitats along the Medway Estuary and Swale Estuary shorelines. The special quality of the natural habitats and geological / geomorphological features is recognised in a number of local, national and international designations, protected under statutory international and national legislation, as well as regional and local planning policies.

There is a legal requirement to consider the implications of any 'plan or 'project' that may impact on a Special Protection Area (SPA) or candidate Special Area of Conservation (cSAC), through the European Union Habitats Directive (Council Directive 92/43/EEC) and Birds Directive (Council Directive 79/409/EEC). The Defra High Level Target for Flood and Coastal Defence (Target 4 – Biodiversity) also requires all local councils and other operating authorities to:

[7] Defra (2005a) Making Space for Water: Taking forward a new Government strategy for flood & coastal erosion risk management – Introduction. Available online at: http://www.defra.gov.uk/environ/fcd/policy/strategy.htm

Defra (2005) Making Space for Water: Flood & Coastal Erosion Risk Management Innovation Fund. Project description available online at: http://www.defra.gov.uk/environ/fcd/policy/strategy/innovfnd.htm

- Avoid damage to environmental interest;
- Ensure no net loss to habitats covered by Biodiversity Action Plans;
- Seek opportunities for environmental enhancement; and,
- Report progress in implementing actions that contribute to SSSI PSA Target and all losses and gains of habitats resulting from flood and coastal erosion risk management operations to the Environment Agency.

The EU Water Framework Directive[8] also requires that water bodies such as estuaries reach at least 'good status' by 2015. A key requirement for the SMP is therefore to promote the maintenance or enhancement of biodiversity, through identifying biodiversity opportunities.

Coastal management can have significant impact on habitats and landforms, both directly and indirectly. In places, coastal defences may be detrimental to nature conservation interests, e.g. coastal squeeze of internationally designated intertidal habitats in front of defences. However, in other locations the presence of defences sustains, albeit temporally, the present interests of a site, e.g. freshwater habitats at Luddenham Marshes. However, one must recognise that the preservation of freshwater marshes may be at the 'expense' of alternative, more dynamic habitats i.e. saltmarsh. Coastal habitats may also form the coastal defence, e.g. the shell spit at Shell Ness. Therefore coastal management decisions need to be made through consideration of both nature conservation and risk management.

Although the conservation of ecological features in a changing environment remains key, in terms of environmental sustainability, future management of the coast needs to allow habitats and features to respond and adjust to change, such as accelerated sea level rise. It is recognised that coastal habitats cannot always be protected *in situ* because a large element of their ecological interest derives from their dynamic nature and this is important to ensure the continued functionality of any habitat. This poses a particular challenge for nature conservation and shifts the emphasis from 'preservation' to 'conservation'. Natural England (formerly English Nature) are actively seeking to ensure that coastal erosion and flood risk management proposals are designed to ensure that all designated sites are conserved and where possible enhancement opportunities that benefit ecology and geology are implemented, whilst also allowing the coast to remain naturally dynamic. Under Section 28G of the Countryside and Rights of Way Act 2000, government bodies have the responsibility and power to safeguard England's finest and most vulnerable wildlife and geological features. Therefore, accommodating the objectives of environmental bodies, such as Natural England, requires flexibility in the assessment of nature conservation issues, possibly looking beyond the designation boundaries to consider wider scale, or longer term, benefits.

The SMP also needs to consider opportunities for enhancing biodiversity throughout the SMP area, not just at designated sites. It has been identified that there are a significant number of biodiversity opportunities within this SMP area. These are where Managed Realignment has been proposed i.e. within the middle Medway Estuary and along both north and south banks of the Swale. There are other areas along this frontage where biodiversity opportunities can be taken. Incorporating localised

[8] http://www.defra.gov.uk/environment/water/wfd/index.htm

realignment opportunities into Hold the Line policies is such an example e.g. along frontages in the inner Medway estuary Managed Realignment also serves to highlight where future development in the flood plain would be inappropriate. Both of these will however, need to be balanced against the socio-economic objectives for the area being considered.

Human (Socio-Economic) Environment

The human environment covers such aspects as land use (both current and future), heritage and landscape (which may be both natural and man-made).

Land-use:

Historically, development of the coast has taken place unconstrained. Planning Policy Guidance 20 (PPG20: Coastal Planning)[9] identifies that approximately 30% of the coastline of England and Wales is developed, with much of this development taking place before the introduction of the Town and Country Planning Act 1947. Growth of built development, both commercial and residential, within the coastal zone over the centuries has increasingly required engineering works to defend properties and assets against the risk of erosion and flooding. However, continued construction of hard-engineered coastal and flood defences to protect development may not be economically sustainable in the long-term (see Section 3.2.2). Local Development Frameworks now identify the need for 'sustainable development' (section 39 of the recently reformed Planning and Compulsory Purchase Act, 2004); although the exact definition of this is uncertain, it recognises that opportunities for development on the coast are limited due to risk of flooding, erosion, land instability and conservation policies (as discussed above). PPG20 states that in the coastal zone, development plan policies should not normally permit development that does not require a coastal location. Planning Policy Statement 25 (PPS25: Development and Flood Risk)[10] sets out the Government's policies for planning authorities to ensure that flood risk is properly taken into account at all stages in the planning process and to prevent and direct development away from areas at high risk of flooding.

The South East Plan (2006)[11] builds upon this, adopting a catchment wide approach to water management and acknowledging the links between biodiversity, water quality and flood and erosion risk management. Policies NRM6 (coastal zone management) and NRM3 (sustainable flood risk management), in particular, require local planning authorities to take account of Shoreline Management Plans, with the former advocating an integrated approach to coastal planning and management.

Thames Gateway, Europe's largest economic, social and environmental regeneration programme, extends along the southern banks of the Thames, through the Medway, to Sittingbourne and the Isle of Sheppey. Consequently a number of Thames Gateway regeneration projects are located within the

[9] http://www.planningportal.gov.uk/england/professionals/en/1021020428593.html

[10] http://www.communities.gov.uk/index.asp?id=1504640

[11] http://www.southeast-ra.gov.uk/southeastplan/plan/view_plan.html

SMP area, e.g. the Isle of Grain/Hoo Peninsular, Medway Waterfront, Chatham City Vision, Rochester Riverside, Milton, Kemsley and Sittingbourne.

A number of major commercial and industrial interests are located along this SMP shoreline e.g. power stations, container ports, and paper mills, as well as other major assets such as the Ports of Sheerness and Chatham and the large urban areas of the Medway Towns (Rochester, Chatham and Gillingham). The continuation of these industries and commercial activities is essential to sustain the economy of the region as a whole.

Tourism is relatively low in this area compared to other parts of Kent, however it still plays an important role and is valuable to the local economy. The area attracts visitors primarily to the estuaries' historic conservation areas (e.g. Rochester, Chatham Historic Dockyard and Queenborough) and to the landscape of the rural estuary environment (e.g. walkers, cyclists, photographers, birdwatchers).

The Medway and Swale estuaries form part of the Greater Thames Estuary, one of the busiest water recreation resources in the UK, hence water based recreation within the Medway and Swale estuaries is an important component to this resource. The estuary shorelines also represent an important recreational and amenity resource and the area attracts a diverse range of recreational pursuits in addition to water based activities, including: bird watching, wildfowling, walking and cycling.

Although assets landward of current defences, access routes to the shoreline and public rights of way may be protected through maintaining existing defences, it must be recognised that continuing such defence practices would in the longer term result in a significant alteration in the nature of the coast, with large concrete seawall structures and narrower intertidal areas.

Heritage:

Heritage features are valuable for a number of reasons (English Heritage, 2006)[12]:

- They are evidence of past human activity;
- They provide a sense of place (or roots) and community identity;
- They contribute to the landscape aesthetics and quality; and,
- They may represent an economic asset due to their tourism interest.

These assets are unique and if destroyed they cannot be recreated. Whilst they are vulnerable to any coastal erosion the very process of erosion is uncovering sites of historical interest. Only a few sites are protected by statutory law, but many more are recognised as being of high importance. Government advice in PPG15 (Planning and the Historical Environment)[13] and PPG16 (Archaeology and Planning)[14] promotes the preservation of important heritage sites, wherever practicable. However, due to the dynamic nature of our coastlines, this is not always possible, or sustainable. Therefore each site must be considered individually and balanced against other objectives at that location.

[12] English Heritage (2006) Shoreline Management Plan Review and the Historic Environment: English Heritage Guidance.

[13] http://www.planningportal.gov.uk/england/professionals/en/1021020427913.html

[14] http://www.planningportal.gov.uk/england/professionals/en/1021020427943.html

The long maritime history of this part of the South East coastline has resulted in a large number of important heritage sites, and areas with heritage potential, being present. Major heritage features include historic fortifications, harbours and dockyards, military installations, coastal settlements and industry. However, there are a great many other features which shoreline management policy could potentially affect, such as the preserved artefacts contained in buried landscapes.

Landscape:

Parts of the SMP shoreline are designated and protected for their landscape quality as Areas of Outstanding Natural Beauty, Special Landscape Areas and Character Areas. However, in general, landscape is difficult to value objectively as it is a mixture of the natural environment and social and cultural history. Therefore defining a sustainable landscape is usually dependent upon the human and natural environment factors discussed above.

4 THE PREFERRED PLAN

4.1 Plan for Balanced Sustainability

The SMP is built upon seeking to achieve balanced sustainability, i.e. it considers people, nature, historic and economic realities.

The preferred policies proposed for the present-day provide a high degree of compliance with objectives to protect existing communities against flooding and erosion. The proposed long-term policies promote greater sustainability for parts of the shoreline where natural process and evolution provide a practical means of managing the shoreline. However, the protection of the significant assets present along sections of the shoreline remains a strong focus for the long-term sustainability of the economy and communities of this area.

The rationale behind the preferred plan is explained in the following sections of text, which consider the SMP area as a whole. This is presented in five sub-sections which broadly reflect differing processes and risks within the two estuaries; the outer Medway Estuary (**Section 4.1.1**); the middle Medway Estuary (**Section 4.1.2**); the inner Medway Estuary (**Section 4.1.3**); the outer / middle Swale Estuary (**Section 4.1.4**) and the inner Swale Estuary (**Section 4.1.5**). Details of the preferred policies for individual locations to achieve this Plan are provided by the individual Policy Unit statements in Chapter 5.

4.1.1 Medway – Outer Estuary (Isle of Grain and Sheerness)

The constrained mouth of the River Medway joins the open coast between high land on the Isle of Grain on the mainland, and Sheerness, located at the north-western extent of the Isle of Sheppey. As such, there are interactions between open coast and estuarine processes in this location. The constrained ebb dominant channel is bordered by relatively narrow and steep mudflats, which, around the Isle of Grain, are internationally designated.

Both the western and eastern shorelines of the outer estuary are heavily defended, providing protection from erosion and flooding to nationally important industry, commercial activity and infrastructure on both the mainland and the Isle of Sheppey. There is very strong justification for seeking to prevent erosion and inundation of these particular frontages and the consequent increased risk to assets and services. However, ongoing sea level rise will result in further narrowing of designated intertidal habitats with coastal squeeze. It is envisaged that these management practices will continue along these frontages over the next 100 years, although decommissioning of the Power Station or the reduced importance of commercial activity on the Isle of Grain, would allow some realignment on this frontage in future revisions of the SMP.

4.1.2 Medway – Middle Estuary (Colemouth Creek and Chetney Marshes to the Medway Towns, including the Medway islands)

The flood dominant middle Medway estuary is overly wide with extensive intertidal areas and is designated for its ‘industrial’ and ‘natural’ estuary landscape value.

The estuary is wider than the ideal form in the middle estuary and consequently a large area of saltmarsh (Stoke Saltings) has developed between Colemouth Creek and Kingsnorth Power Station, linking the two important industrial areas. The internationally designated saltmarsh, which is currently accreting, provides additional natural protection to the associated infrastructure which skirts the

frontage. Significant defence structures around Kingsnorth Power Station provide protection from erosion and flooding to the nationally important industrial area. The implementation and future review of SMP policy in this area should pay attention to the proposal of a new larger power station on the site. However, ongoing sea level rise will result in further narrowing of designated intertidal habitats with coastal squeeze. It is envisaged that this management practice will continue along the Power Station frontage over the next 100 years, although decommissioning of the Power Station would mean the policy could change in future revisions.

Wide intertidal mudflats and saltmarsh of international importance continue to extend along the frontage towards Hoo St Werburg. Apart from the industrial areas, the hinterland predominantly comprises undeveloped coastal grazing marsh (some of which is also internationally designated) and agricultural land with a number of small residential communities located on higher land. Along part of this frontage, south-east of Hoo St Werburg, a proposal has been put forward for a mineral extraction operation and habitat restoration project.

West of Hoo marina, undeveloped coppice at Cockham Wood extends along the shoreline to Lower Upnor. The wood extends over soft clay cliffs, each of which are of national biological and geological importance respectively. The woodland, also designated for its landscape value, is fronted by narrow areas of grass, beach and then intertidal mudflat. The only built asset along this frontage is Cockham Wood Fort, a nationally important heritage asset, parts of which are being actively eroded by the river. Protection of the heritage feature has been ruled out as it is considered unsustainable and uneconomic in the long term. This section of shoreline is undefended and is currently managed under a policy of No Active Intervention. It is therefore envisaged that this management practice will continue in this location over the next 100 years to maintain landscape value and to allow the continuation of natural shoreline evolution.

The area of frontage between Chetney Marshes and Gillingham is largely undeveloped with the exception of a number of scattered villages, e.g. at Lower Halstow, Upchurch, Otterham, Lower Rainham and Lower Twydall. The area is important agriculturally (with extensive orchards and valuable Grade 1 agricultural land) and for land based recreation (Riverside Country Park, RSPB and Local Nature Reserves, Saxon Shore Way and numerous locations for bird watching and wildfowling). Large areas of low-lying coastal grazing marsh and freshwater habitat at Chetney Marshes, Barksore Marshes and Horsham Marsh are nationally and internationally designated. A range of policies have been proposed along this frontage (see individual policy unit statements).

A local road runs along the frontage between Funton and Raspberry Hill. At present this frontage is defended, however the road floods during long heavy periods of rainfall and high tidal levels. Continuing to defend this section of shoreline is deemed unsustainable and uneconomic in the future. With the implementation of No Active Intervention it is envisaged that the initiation of natural shoreline realignment and uncontrolled flooding will render the road unusable within approximately 50-100 years. As such, it is noted that the road will become inoperable at some point within the next century. This fact is accepted by the Highways Agency and, in due course, consideration will need to be given to management of this loss. Mirroring the northern areas of the middle Medway estuary, the estuary is wider than its ideal form in this location and consequently large mudflat and saltmarsh areas and saltmarsh islands have developed, all of which are internationally designated for their environmental importance. Nationally significant Scheduled Monuments are located on Hoo Saltmarsh Island (Hoo Fort SM), which is also a dredging disposal site, and Darnet Ness (Darnet Fort SM). Nor Marsh Island forms part of Nor Marsh and Motney Hill RSPB Reserve. The intertidal areas are expected to remain

stable over the next 50 years, as the sediment budget is expected to be sufficient to meet demand, but could go into deficit after this time, rendering intertidal areas more susceptible to erosion with coastal squeeze. The implementation of a No Active Intervention policy for the islands is considered appropriate to allow the continuation of natural erosion and periodic inundation of the islands. It is considered unsustainable and uneconomic to protect the individual heritage features in the long term. An ongoing monitoring programme is recommended to assess the future management needs of the islands.

These factors mean that the only practical solution to long term management of the middle estuary is to maintain the current shoreline along parts of the frontage (to protect valuable assets) and to seek opportunities for Managed Realignment and No Active Intervention along discrete sections (on both northern and southern banks), to enable future 'flexibility' of the shoreline as sea levels rise. A policy of Managed Realignment in discrete locations will maintain the important environmental and landscape values in these areas, and help reduce future effects of coastal squeeze, thus providing the most sustainable form of coastal management for this shoreline.

4.1.3 Medway – Inner Estuary (Medway Towns to Allington Lock)

The ebb dominant, highly sinuous, narrow channel with limited intertidal areas extends from the dense urban areas of the Medway Towns in the north to the southern tidal limit at Allington Lock.

The northern section of the inner estuary is characterised by heavily defended shorelines protecting a significant number of residential, commercial, recreational and heritage assets, connected by regionally important strategic links. This area is important not just commercially but for its heritage importance, where many visitors are attracted to the proposed World Heritage Site at Chatham Historic Dockyard. Under the preferred long-term plan the Medway Towns (Rochester, Chatham and Gillingham) and the urban centres of Frindsbury and Strood will continue to be protected to maintain assets. This is likely to lead to the continued erosion and deepening of the narrow channel. As sea levels rise and fluvial flows increase defences in this area will become subject to increased pressure, with defences becoming more exposed to undermining and overtopping.

South of the Medway Bridge the landscape changes to that of a meandering river valley with villages interspersed with agricultural land, freshwater marshes and lakes leading to increasingly urban and industrial areas to the south towards Allington Lock.

The plan to allow and seek further opportunities for Managed Realignment between the Medway Bridge and Allington Lock will allow for more sustainable and flexible estuary management in the future. While important assets remain defended, Managed Realignment in discrete locations will maintain the important environmental and landscape value of these areas by creating important brackish and saline habitats and allow natural meandering to re-commence in some sections. Set-back defences may also provide opportunities for flood storage areas upstream and help reduce pressure in confined sections of the inner estuary. Further studies will be required to investigate the 'in combination' effect of multiple areas of realignment in the upper reaches of the Medway estuary and to define the exact standard and position of any realigned defences along these frontages.

4.1.4 Swale – Middle and Outer Estuary (Kingsferry Bridge to Shell Ness and Faversham Creek)

The Swale is an 18.4km[15] channel that separates the Isle of Sheppey from mainland Kent. It is unusual in having two mouths, one to the west at Queenborough, connecting the Swale with the Medway Estuary (Inner Swale Estuary), and the second to the east where the mouth joins the open coast at Shell Ness. As such there are interactions between open coast and estuarine processes at the eastern mouth. Freshwater inputs come from a series of smaller creeks on the southern bank i.e. Faversham, Oare, Conyer and Milton Creeks which drain from the North Downs.

The southern bank of the middle and outer Swale extends from Kingsferry Bridge in the west to Nagden in the east, which forms the boundary with the adjacent Isle of Grain to South Foreland SMP2. South of Kingsferry Bridge is an important industrial area which includes docks, a paper mill and other industry at Kemsley. The importance of the industry combined with essential infrastructure along the frontage (i.e. A249 road, railway line, electricity sub-station and associated pylons) means that a Hold the Line policy is justifiable in this location to provide protection against flooding and erosion.

The towns of Sittingbourne and Faversham and the villages of Conyer and Oare are located at the southern extremities of Milton, Faversham, Conyer and Oare Creeks respectively. The historic towns of Sittingbourne and Faversham provide regionally important centres supporting a wide range of residential, commercial and industrial activities that service other communities in the area. As such, there is strong justification for seeking to prevent erosion and flooding of these particular frontages and the consequent increased risk to properties and services. As sediment supply within the Swale Estuary is expected to continue to meet demand over the next 100 years, intertidal habitats along both Milton and Faversham Creek are expected to remain stable.

The majority of shoreline between Milton Creek and Faversham Creek is of considerable environmental interest, as both the low lying agricultural marshland and fronting tidal mudflats and saltmarsh are internationally designated. The large floodplain, which also includes parts of Sittingbourne and Faversham, extends to higher land in the south. These factors, along with the importance and value of the range of assets within the flood risk area, mean that the only practical solution to management of this frontage is to maintain the current shoreline alignment where assets warrant long term protection (i.e. Sittingbourne, Conyer, Oare and Faversham) and realign defences in a set-back position along the remaining frontage. A policy of Managed Realignment in discrete locations will maintain the important environmental and landscape values in these areas, and help reduce future effects of coastal squeeze, thus providing the most sustainable and flexible form of coastal management for this section of shoreline.

The northern shoreline of the Swale encompasses the south of the Isle of Sheppey, an extensive low lying frontage extending between Kingsferry Bridge in the west and Shell Ness in the east, which forms the boundary with the adjacent Isle of Grain to South Foreland SMP2. The area, having experienced extensive reclamation in the past, is characterised by secondary embankments criss-crossing freshwater marshes and grazing land before rising to higher land in the north. Broad expanses of internationally designated freshwater habitat, fronted by accreting areas of saltmarsh

[15] Joint Nature Conservation Committee (JNCC), 1997. *An inventory of UK estuaries.* 5. Eastern England.

(which are also internationally designated), are separated by two small areas of higher ground (i.e. Isle of Harty and Elmley Island) formed as a result of underlying more-resistant London Clay deposits. These areas of high land provide natural boundaries for separating policy units along this frontage. The low-lying hinterland, which if flooded, has the potential to inundate up large areas of environmentally designated agricultural land. Land behind existing defences is generally lower than the fronting intertidal areas, and is significantly lower than mean Spring tide levels.

Given the extent of land at risk however, it is considered imperative that flexible flood defence management is employed to manage the environmental assets responsibly and sustainably over the next 100 years. It is proposed to promote realignment along the low lying frontage. Realignment is possible here as the flood plain is relatively sparsely populated, and there is higher ground to which a secondary defence alignment could be tied into in places, limiting the extent of potential flood propagation. This approach will reduce the long term defence requirement by utilising higher ground where practicable, in combination with shorter defence lengths. The alignments of secondary defences to limit flooding have not been defined by the SMP, but to achieve the benefits of allowing the shoreline to realign it is anticipated that there would be a managed change of some freshwater habitats. Further studies will be required to investigate potential Managed Realignment extents.

The one other notable environment present on the Isle of Sheppey is that of the shell and sand spit at Shell Ness. This relic feature, actively managed toward the open coast, provides a natural addition to flood protection at the eastern mouth of the Swale. Under rising sea levels it is anticipated that it will become increasingly difficult to maintain the beach along this frontage. Coastal squeeze together with a diminished supply of natural beach building sediment offshore would lead to increased erosion if the current alignment were to be held in the long-term. It is proposed to construct defences set back from the current coastline, to allow some natural reorientation of the shoreline. This would reduce the need for new defence works or beach management measures, possibly creating cost savings and environmental enhancements.

4.1.5 Swale – Inner Estuary (Kingsferry Bridge to Queenborough)

The inner Swale Estuary comprises a narrow canalised channel which extends from the Kingsferry Bridge in the south, to the estuaries' second mouth at Queenborough, where it connects to the Medway Estuary. The estuary is very narrow along this frontage and consequently intertidal areas are minimal. These Intertidal habitats are internationally designated for their environmental importance, along with a small section of freshwater marsh immediately north of the Kingsferry Bridge. Although these intertidal areas are expected to remain stable over the next 100 years, as the sediment budget is expected to be sufficient to meet demand, intertidal habitats will become increasingly susceptible to erosion due to coastal squeeze as sea levels rise.

The towns of Rushenden and Queenborough, located towards the western Swale mouth, are two important residential and commercial areas as well as being recognised for their future development potential and national heritage importance respectively. It is considered that the continued management of inundation and flood and erosion risk to assets in these locations is economically justified and environmentally acceptable, although ongoing sea level rise will result in further narrowing of designated intertidal habitats with coastal squeeze.

The only practical solution to long term management of the inner estuary is to maintain the current shoreline along parts of the frontage (i.e. to protect valuable assets at Rushenden and Queenborough) and to seek opportunities for Managed Realignment along southern sections of this frontage (i.e.

between Kingsferry Bridge and Rushenden), to enable future 'flexibility' of the shoreline as sea levels rise. A policy of Managed Realignment in discrete locations will maintain the important environmental and landscape value of these areas, and help reduce future effects of coastal squeeze, thus providing the most sustainable form of coastal management.

A return to a more natural functioning shoreline, promoted in the southern half of this frontage, will allow the shoreline to re-orientate to a realigned position, with the formation of brackish and saline habitats. Dependant upon the alignment of set back defences, this will involve the long term inundation and displacement of areas of freshwater habitat. Further studies will however be required to investigate potential contamination issues with a Managed Realignment policy at the Rushenden Disposal Site, before any change of policy is initiated at this location.

4.2 Predicted Implications of the Preferred Plan

Direct comparison is made below between the preferred plan / policies and a No Active Intervention approach; this being the position if no money was spent on coastal defence i.e. if nothing was done. This approach defines the benefits of implementing the plan, as it highlights what would be lost under No Active Intervention against what would be gained if the preferred policy was implemented. Where No Active Intervention is the preferred policy then obviously this methodology is not required.

4.2.1 Implications for property and land use

For urban and industrial areas of the SMP shoreline the recommended plan is to maintain existing defences where it is economically viable, to do so, in the long term. This is to minimise risk to property and assets along the extensively developed sections of the estuaries. However, for some significant sections of the shoreline, a change in management policy has been identified in the longer term where a long term Hold the Line policy will not be economically viable, technically sustainable, or environmentally acceptable. In these locations policies of No Active Intervention or Managed Realignment need to be considered. The SMP has identified areas where a more naturally functioning coastline would be to the benefit of the natural environment and to estuarine processes. However, there would be potential changes to land and environmental assets should these policies be implemented.

For the proposed recommended plan, the maximum number of built assets lost to erosion by year 2105 would potentially be 4 (3 heritage assets, 1 residential and 1 commercial building). This compares to the No Active Intervention baseline where, erosion losses throughout the SMP frontage could total 101 residential, 24 commercial properties and 3 heritage assets. Consequently the plan provides for protection from erosion to over 100 properties over the next 100 years.

The above figures only relate to losses through shoreline erosion. In addition, there are vast numbers of assets that could potentially be at risk from inundation under No Active Intervention policies on the flood risk frontages. These include around 170 properties on and around the Isle of Grain, 160 properties around Kingsnorth, 4,200 properties in the Medway Towns (Strood, Frindsbury, Chatham, Rochester and Gillingham), 1,350 properties between Medway Bridge and Allington Lock, 180 properties between Gillingham and Kingsferry Bridge, 4,300 properties in the Sittingbourne and Faversham areas and 8,200 properties on the Isle of Sheppey (Sheerness, Queenborough, Rushenden and Shell Ness). This gives a total of around 18,560 properties that could potentially be lost due to permanent or frequent inundation. Under the recommended policies the great majority of these assets will be protected, although a Managed Realignment option at Shell Ness (in conjunction

with a Managed Realignment policy along the adjacent open coast – Policy Unit 4a 06 Leysdown-on-Sea to Shell Ness) will result in increased flood and erosion risk to properties.

Agriculture represents an important part of the local economy and along the estuary shorelines there are various grades of agricultural land. Some areas of agricultural land will be exposed to coastal flooding and erosion under Managed Realignment or No Active Intervention policies. It should be noted that degree of exposure will be dependant on the extent of Managed Realignment, which will be subject to further studies following the SMP.

Major infrastructure in the SMP area, including major roads, railways and other transport links, the Ports of Chatham and Sheerness, and power stations at Kingsnorth and Grain, will continue to be protected under the recommended policies. A No Active Intervention policy between Funton and Raspberry Hill will, however, result in the loss of a small local road as it is considered unsustainable and uneconomic to continue to protect the road in the long term.

4.2.2 Implications for nature conservation

The low lying areas along this frontage are notable for their freshwater habitats, which are covered by Local and National BAPs and much of which are designated as being internationally or nationally important. The proposed long term realignments in locations around the Medway and Swale estuaries would displace some SPA and Ramsar designated freshwater habitats. However, the creation of important brackish, intertidal and saltmarsh habitats and the promotion of a 'naturally functioning' shoreline under this policy provide important nature conservation benefits i.e. improving the existing habitats and creating new, dynamic habitats. Effects on European designated sites will This will need to be managed in line with the Habitats Regulations Assessment (**Appendix J**) and the Regional Habitat Creation Programme (RHCP). The tables overleaf summarise the key habitat management requirements for the plan.

Table 4.1 European Habitat Balance Sheet

Epoch (yrs)	Greater Thames CHaMP Intertidal Losses in SMP area (Ha)	SMP Intertidal (MR) in Undesignated areas (Ha)	SMP Intertidal Gains (MR) in Designated areas (Ha)	SMP Designated Freshwater Displacement (Ha)	RHCP Intertidal Habitat Compensation for SMP (Ha)	RHCP Freshwater Habitat Compensation for SMP (Ha)
0-20	370	<113	257<370	-257<-370	0	370
20-50	+ 295	+32	+295	-295	0	+295
50-100	+1035	+0	+435	-195	<600 (tbc)	+195
TOTAL	1700	145	987<1100	860	<600 (tbc)	860

Table 4.2 Potential RHCP Freshwater Compensation Areas

Epoch (yrs)	Location	Habitat	Cumulative Habitat Area (Ha)
0-20	Rank 1 – North Swale	Grazing Marsh & Standing Water	370
20-50	Rank 2 - South Swale		665
50-100	Rank3 - Hoo St. Werburg		860

Table 4.3 SSSI & BAP Habitats

Habitat	BAP (y/n)	BAP (Ha)	SSSI (Ha)	BAP& SSSI	Comp(y/n)	Compensation Reqd. (Ha)
Broadleaved woodland - semi-natural	y	0.7	0.0	0.7	y	**0.7**
Scrub - dense/continuous	n	0.0	3.7	3.7	y	**3.7**
Neutral grassland - semi-improved	y	32.3	21.5	53.8	y	**53.8**
Calcareous grassland - semi-improved	y	0.0	0.8	0.8	y	**0.8**
Marsh/marshy grassland	y	1.9	0.0	1.9	y	**1.9**
Other tall herb and fern - ruderal		0.0	1.4	1.4	y	**1.4**
Swamp	y	11.7	9.9	21.6	y	**21.6**
Standing water	y	1.9	0.2	2.1	y	**2.1**
Running water	y	0.0	1.0	1.0	y	**1.0**
Intertidal - mud/sand	y	0.5	1.3	1.8	y	**1.8**
Saltmarsh - dense/continuous	y	0.8	4.1	4.9	y	**4.9**
Cultivated/disturbed land - amenity grass	n	0.0	0.4	0.4	y	**0.4**
Cultivated/disturbed land - ephemeral	n	0.0	1.1	1.1	y	**1.1**
Unknown	n	0.0	9.9	9.9	n	**0.0**
BAP Compensation		**49.7**				
Holborough Marshes SSSI Compensation			**55.4**			
TOTAL Compensation						**95.3**

In areas where the proposed recommended plan is to Hold the Line, built assets and environments behind defences will continue to be protected as sea levels rise. Localised intertidal areas will, however, become increasingly subject to erosion due to coastal squeeze with increased water levels and fluvial flows. However, these will be countered by habitat growth within the middle reaches of the estuary and these recommended policies are therefore deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Nationally designated undeveloped coppice and soft cliffs at Cockham Wood are currently undefended. The proposed No Active Intervention policy at Cockham Wood will continue to allow the

shoreline to function and evolve freely, maintaining its landscape value and natural evolution of this shoreline.

The relic shell and sand spit at Shell Ness will continue to provide a degree of natural flood protection at the eastern mouth of the Swale. However, under the proposed plan to construct set back defences, the spit will be allowed to reorientate naturally as sea levels rise.

4.2.3 Implications for landscape

The area around Wouldham Marshes is designated under the North Kent Downs Area of Outstanding Natural Beauty (AONB), whilst many other sections of this coastline are recognised and protected for their landscape quality through various Character Areas and the North Downs and North Kent Marshes Special Landscape Areas. There are also many areas designated as being of 'local' landscape value.

The recommended long-term plan for the SMP is to sustain the current urban areas through proactive management of the existing defences, recognising that defences will be need to be upgraded in the long term. However, opportunities for forming a less managed / free functioning dynamic shoreline in other areas have been taken to create a more natural estuary landscape, reducing the extent of man-made structures along the frontages. This is deemed to provide a more sustainable and aesthetically appealing landscape than a policy of defending the whole estuary, which would involve construction of new, more substantial defences.

In general, the plan will maintain the landscape quality of the majority of frontages.

4.2.4 Implications for the historic environment

The Medway and Swale estuaries enjoy an abundance of archaeological and heritage sites resulting from their rich and varied cultural heritage, maritime trading links and historic fortifications and defences; many of which are located on or adjacent to the shoreline.

Those assets along sections of the estuary where defences will be maintained and improved will be protected in the long term. Significant protected features include the following Scheduled Monuments (SMs); coastal artillery defences on the Isle of Grain, Upnor Castle, Temple Manor, Bishop's Palace at Halling, Aylesford Bridge, Chatham Dockyard, Oare Gunpowder Works, Castle Rough, Sayes Court, Queenborough Castle and Sheerness Defences. There are also many unscheduled sites of importance that are protected, along with areas of archaeological potential. Many listed buildings and Conservation Areas within the urban areas will also be protected under the recommended plan.

However, the policies which promote long term realignment will invariably impact upon the historic environment, as the coverage of the coastal heritage resource is so extensive. Managed Realignment proposed throughout both estuaries will potentially result in an increased risk to unknown buried heritage features. These increased risks under the recommended long term plan for this SMP, must be recognised and consideration should be given to an appropriate programme of survey, recording and investigation to record these important sites, and those potential features not yet identified.

The proposed policy of continued No Active Intervention at Cockham Wood and for the Medway Islands will result in erosion of, and in the long term, an increased risk to, three SMs; Cockham Wood Fort (Cockham Wood), Hoo Fort (Hoo Saltmarsh Island) and Darnet Ness Fort (Darnet Ness). It is considered unsustainable and uneconomic to protect these three heritage features in the long term.

4.2.5 Implications for amenity and recreational use

The Medway and Swale estuary shorelines are an important area for tourism and recreation use. This SMP shoreline is extensively covered by coastal footpaths, including the Saxon Shore Way (Hoo St Werburg to Frindsbury; Rochester to Kingsferry Bridge and along the southern shore of the Swale) and the Medway Valley Walk (Rochester to Allington Lock). Sections of these footpaths will be lost at varying times along frontages where No Active Intervention or Managed Realignment are proposed. However, where these policies are proposed, there is potential for footpaths to be realigned as the shoreline realigns and / or when defences are realigned.

Where the shoreline is allowed to realign there will be potential access issues, with existing access routes often being lost, e.g. on the south and north banks of the Swale. However in some places it will be a necessity for these to be re-established, due to health and safety obligations.

4.3 Managing the Change

The long term management of the shoreline is important. Continuing with current practices of defence is unsustainable for some frontages, and policies must change to reflect the economic justification and sustainability of each particular frontage unit.

The consequences of these changing policies will need to be managed at various levels of planning and government. The issues that have been identified by this plan are not limited to this shoreline and will be common to many other areas around the UK. At this time, the UK Governments' 'Making Space for Water' is considering a number of these issues[16].

4.3.1 Recommendations

Achieving this plan may require changes in planning and policy at local, regional and national government levels. Regional planning needs to consider the messages being delivered by this Plan, and ensure that future proposals for regional development and investment are made accordingly. Such planning needs to be looking beyond the current 20 year horizon.

Local Development Planning should consider the risks identified in this plan and avoid approving inappropriate development in areas at risk of flooding and erosion. Local Development Planning also needs to consider that relocation of displaced people and property may require land to be made available within the same settlements, in order to maintain the same level of community and may need to become increasingly flexible to enable this. Locations for new developments may need to be identified.

Environmental bodies will have to make some difficult decisions in developing a long-term vision for a dynamic coastal environment. However, in the short-term there is the need to ensure that conservation interests within designated sites, or in the wider environment, are appropriately addressed by coastal and estuarine management. The findings of the **Habitats Regulations Assessment** will be fundamental to the implementation of the SMP. In order for long-term solutions to

[16] Defra, 2005a. Making Space for Water: Taking forward a new Government strategy for flood & coastal erosion risk management – Introduction. Available online at: http://www.defra.gov.uk/environ/fcd/policy/strategy.htm and http://www.defra.gov.uk/environ/fcd/policy/strategy/innovfnd.htm

be sought, public and local communities should be involved. Natural England published a Maritime Strategy entitled 'Our Coasts and Seas: making space for people, industry and wildlife' (available from the English Nature website[17]) to help deliver this.

Where policies may result in an increased risk to property and assets, whether due to coastal erosion or flooding, the effect on property owners should be managed through exit strategies. These will need to address the removal of buildings and other facilities well in advance of any loss. The plans for relocation of people also need to be established as does the basis on which mitigation should be funded. However, mitigation measures do not fall solely upon national and local government, and should not be read as such within this plan. Business and commercial enterprises will need to establish the measures that they need to take to address the changes that will take place in the future. This includes providers of services and utilities, which will need to make provision for this long-term change when upgrading or replacing existing facilities in the shorter term. They should also consider how they will relocate facilities that will become lost to erosion or flooding, and the need to provide for relocated communities. Other parties needing to consider mitigation measures will be the local highways authorities and bodies responsible for local amenities (including churches, golf clubs etc).

Private land and property owners will need to consider how they will deal with changes to the shoreline that affects their property. Currently maritime authorities have 'permissive powers' to undertake coastal flood and erosion works, there is no obligation for the operating authorities or national government to assure protection against flooding or erosion. Similarly, there is no reason, at present, to assume that this will change in the future or that individual losses would be compensated from central funds.

However, the preferred Plan provides a long lead-in time for the changes that will take place at some point in the future, as advised by the Action Plan. This will allow those parties that are affected by the plan to adjust accordingly. To manage these changes effectively and appropriately, the approach put forward in the SMP needs to be considered now, not in several decades time.

[17] www.english-nature.org.uk

5 POLICY STATEMENTS

5.1 Introduction

This chapter contains a series of statements presenting the preferred policy and implications for individual locations. These provide local detail to support the SMP-wide preferred plan, presented in **Chapter 4**, and consider locally-specific issues and objectives, which are presented in the **Annex** to this document. Consequently, these statements must be read in conjunction with those and in the context of the wider-scale issues and policy implications as reported therein.

5.2 Content

Each Policy Statement contains the following:

Policy Unit/Location reference This provides the general name used for reference to each policy unit and the number identifier which is sequential along the shoreline from east to west or clockwise direction (numbering is based upon the sub-cell number E4 followed by a unit number).

Proposed Preferred Plan This is a statement summarising the preferred plan and describing the rationale behind it. These focus upon the long-term plan but also note any different short-term requirements.

Preferred policies to implement the plan This describes the policies and activities that will be undertaken in the short, medium, and long-term to implement the preferred plan. In this respect, "Present day policy" is broadly representative of the next 20 years, "Medium term policy" 20 to 50 years, and "Long term policy" 50 to 100 years. These timescales should not be taken as definitive, but should instead be considered as phases in the management of a location.

If a policy of 'Advance the Line' or 'Managed Realignment' occurs in the short or medium term, it automatically remains the same for remaining term of the plan, this does not necessarily mean that there will be further changes in defence alignment. For example, if the SMP recommends a managed realignment policy in the short term, the policy will remain managed realignment in the medium and long-term too although it is likely there would be only one change in alignment within the life of the plan.

Predicted Implications of the recommended plan for this location This Table summarises the consequences *at this location only* resulting from the preferred policies. These are categorised as "Management activities", "Property, Built Assets & Land Use", "Nature Conservation", "Landscape", "Historic Environment" and "Amenity & Recreational Use", and correspond with information being entered into the national database of SMPs. The implications have been assessed for the situation in terms of each epoch: short (present to 2025), medium (2025 to 2055) and long term (2055 to 2105), again to provide a nationally consistent picture.

5.2.1 Policy Units

Based upon the preferred scenario, Policy Units are identified representing frontages for which a discrete shoreline management policy applies. These are divided to reflect changes in policy over time, and significant differences in policy implications. Figures 1.3 and 1.4 show the full plan area, and identify the subdivision into Policy Units.

The following list identifies the Policy Units for which statements are provided, together with a brief summary of the characteristics that define the Unit, and the page number on which the full statement can be found:

Policy Unit		Description	Page No.
E4 01	Grain Tower to Colemouth Creek	A small narrow shingle beach is located to the north of Grain Tower fronted by wide tidal mudflats; elsewhere intertidal habitat to the east and south of the frontage is internationally designated. Grain village is located on an area of higher land to the north while the majority of the shoreline is dominated by nationally important industry and infrastructure.	48
E4 02	Colemouth Creek to Bee Ness Jetty	A large area of saltmarsh fronts nationally important infrastructure and the residential communities of Lower Stoke and Middle Stoke. The extensive intertidal and some sections of freshwater habitat are internationally designated.	53
E4 03	Kingsnorth Power Station	The nationally important Power Station and associated infrastructure dominates this frontage. Jetties from the Power Station stretch out into the estuary and extend over a number of small islands. The wide intertidal mudflats and saltmarsh along the frontage, including Oakham Marsh Island are internationally designated.	58
E4 04	Power Station to Cockham Wood	Apart from a marina and the residential community of Hoo St Werburg to the west, the frontage mainly comprises low-lying undeveloped agricultural land and coastal grazing marsh, some areas of which, like the wide intertidal habitats along the frontage, are internationally designated.	63
E4 05	Cockham Wood	Undeveloped coppice at Cockham Wood extends along the shoreline and over soft clay cliffs, each of which are of national biological and geological importance respectively. The woodland, used as a recreational amenity, also designated for its landscape value, is fronted by narrow areas of grass, beach and then intertidal mudflat. The only built asset along this frontage is Cockham Wood Fort, a nationally important heritage asset, parts of which are being actively eroded by the river.	69
E4 06	Lower Upnor to Medway Bridge	A dense urban area extends to the shoreline along the majority of the unit, predominantly consisting of the residential areas of Frindsbury and Strood, the commercial and industrial area of the Medway City Estate and regionally important strategic links. The eastern section of frontage is less densely urbanised and is made up of smaller residential areas interspersed with recreational and nationally important heritage features.	72
E4 07	Medway Bridge to North Halling	The railway line closely follows the shoreline along this frontage, separating the ‘fluvial’ estuary channel from the residential communities of Cuxton and North Halling.	76
E4 08	North Halling to Snodland	The meandering Medway channel is bordered by the residential communities of Halling and Snodland and pockets of freshwater habitat. The floodplain is restricted due to the presence of the railway line, which extends the length of the frontage.	79

Policy Unit		Description	Page No.
E4 09	Snodland to Allington Lock	The hinterland is characterised by an area of nationally designated low-lying freshwater lakes (Leybourne Lakes) south of Snodland and urban communities along the remaining frontage towards Allington Lock. The railway line again extends along the whole of the frontage. The estuary channel is fluvial in form and narrows considerably as it meanders south to Allington Lock.	85
E4 10	Allington Lock to north Wouldham	The urban areas of historic Aylesford and Millhall to the south and areas of agricultural land and freshwater habitats interspersed with small settlements towards the north border the narrow estuary channel between Allington Lock and Wouldham.	89
E4 11	Wouldham Marshes	The low-lying area between the village of Wouldham and the Medway Bridge, rising to higher land, is an area of Outstanding Natural Beauty.	93
E4 12	Medway Bridge to west St Mary's Island	The dense urban areas of Rochester and Chatham extend to the shoreline. The residential and commercial frontages are interspersed with a number of river crossings and strategic links between the Medway Towns and Frindsbury and Strood. The frontage is of considerable commercial importance and is of significant international heritage importance (e.g. Chatham Historic Dockyard), which attracts large visitor numbers.	97
E4 13	St Mary's Island to the Strand	The frontage is dominated by the expanding residential area of St Mary's Island and the residential, commercial and recreational areas along the Gillingham frontage, both of which extend to the shoreline. The frontage is of considerable regional importance for attracting visitors to its recreational areas (e.g. Gillingham Pier and Marina). Some intertidal areas are nationally and internationally designated.	101
E4 14	The Strand to west Motney Hill	The shoreline is locally important for its recreation facilities, e.g. The Riverside Country Park, LNR, RSPB Nature Reserve and the Saxon Shore Way coastal footpath. Intertidal areas along the frontage are internationally designated.	106
E4 15	Motney Hill to Ham Green	Localised settlements of Otterham, Upchurch and Ham Green are interspersed with agricultural land and freshwater marsh. Intertidal areas, as well as areas of freshwater habitat at Motney Hill and at Horsham Marsh are nationally and internationally designated for their environmental importance.	110
E4 16	Ham Green to east of Upchurch	The short length of high land comprising of mainly Grade 1 agricultural land is interspersed with isolated properties. Intertidal saltmarsh and mudflat habitats are nationally and internationally designated.	115
E4 17	East Upchurch to east Lower Halstow	The frontage comprises agricultural land, locally important nature conservation sites at Upchurch and Lower Halstow Brickworks and the historically important area of Lower Halstow. Intertidal habitats are nationally and internationally designated.	118
E4 18	Barksore Marshes	Barksore Marshes is a predominantly low-lying peninsular of agricultural land and marshes, with no built assets, which, apart from the northern tip, is, along with intertidal habitats, nationally and internationally designated for its environmental value.	122

Policy Unit		Description	Page No.
E4 19	Funton to Raspberry Hill	The short length of frontage comprises a small local road, running alongside the shoreline, backed by orchards. Intertidal habitats are nationally and internationally designated for their environmental importance.	126
E4 20	Chetney Marshes	A large low-lying peninsular of agricultural land and marshes bordered by both the Medway and Swale estuaries, important for wildfowl breeding. Parts of the marshes are nationally and internationally designated for their ecological importance as are bordering intertidal areas.	129
E4 21	Kingsferry Bridge to Milton Creek	Regionally important industrial, commercial and dock developments and associated infrastructure are located along the low lying frontage. Habitats are of international environmental importance. The Saxon Shore Way follows the shoreline along the majority of this frontage.	135
E4 22	Milton Creek	A number of regionally important commercial and industrial built assets, located close to the creek shoreline. Large residential and commercial areas are located on the creek's floodplain. The Saxon Shore Way traverses the majority of the shoreline.	140
E4 23	Murston Pits to Faversham	A large expanse of floodplain which rises to high land in the south. A small number of properties are located on higher land, around the edge of the floodplain and in the communities of Conyer and Oare. Habitats are of international importance and frontage is of landscape value. The area is locally important for attracting visitors to the Saxon Shore Way and to a number of nature reserves and bird watching sites located along the frontage. Conyer and Oare Creeks and the Gun Powder Works at Oare are of significant heritage importance.	144
E4 24	Faversham to Nagden	A large number of industrial, commercial, residential and heritage assets are located along Faversham Creek and the historic town of Faversham. The area is locally important for tourism to the Conservation Area and Saxon Shore Way. Habitats are internationally designated for their environmental importance.	149
E4 25	Shell Ness to Sayes Court	The frontage comprises a sand and shell beach and spit, which is backed by nationally and internationally designated saltmarsh and low-lying coastal grazing marsh.	152
E4 26	Sayes Court to north Elmley Island	A large expanse of floodplain rising to high land in the north. A small number of properties and farms are located on the floodplain and on higher land. The low-lying hinterland is interspersed with secondary embankments, and consists of agricultural marshes. Habitats are internationally designated. Some sections are part of a National Nature Reserve (NNR) and RSPB Reserve.	156
E4 27	North Elmley Island to Kingsferry Bridge	The low-lying hinterland consisting mainly of agricultural marshland. Habitats are internationally designated. A small number of properties at Minster Marshes and two local roads are set back from the shoreline. The southern section of hinterland forms part of the Swale National Nature Reserve.	162
E4 28	Kingsferry Bridge to Rushenden	A low lying area immediately north of Kingsferry Bridge. An area of high land at Rushenden Disposal Site. Intertidal habitats and small section of freshwater habitat is internationally designated. Important infrastructure set back from the shoreline.	166

Policy Unit		Description	Page No.
E4 29	Rushenden to Sheerness	Urban areas of Rushenden and Queenborough, which is of national heritage importance, the internationally important Port of Sheerness and regionally important strategic links. Intertidal habitats between Rushenden and north of Queenborough are internationally designated.	170
E4 30	Medway Islands	Habitats internationally designated. Hoo Saltmarsh Island dredging disposal site. SMs located on Hoo Saltmarsh Island and Darnet Ness. Nor Marsh Island is part of Nor Marsh and Motney Hill RSPB Reserve.	175

5.2.2 Additional Information

Heritage Features

Where a proposed policy results in the loss of heritage features (known and unknown) it will be important to consider an appropriate programme of survey, recording and investigation to record these important sites, and those potential features not yet identified.

Footpaths

Where a proposed policy results in the loss of footpaths there is potential, subject to planning consents, for footpaths to be re-routed as the shoreline realigns and / or when defences are realigned.

Land Use within Defended Areas/ Affected by Policies

Flood and erosion defences reduce the risk to the assets they protect but they do not remove the risk completely. To be suitably adaptable to future change and future risks all new development of residences or infrastructure in flood and erosion risk areas should be appropriately adaptable, resilient and resistant. Decisions on the land use within flood and erosion risk areas should fully consider the risk and be adaptable to change.

Where the Shoreline Management Plan recommends Managed Realignment of existing defences, the effect on parties currently protected by the defences will be part of the 'management' of that change.

Managed Realignment Policies

Managed realignment extents are not defined in the following SMP Policy Unit Statement maps as the actual realignment extents along any frontage where Managed Realignment has been proposed will need to be the subject of further studies before any realignment scheme is undertaken. These studies will be required to:

- Identify the best alignment and extent of defences on technical, social, economic and environmental grounds, that best manages flood risk;
- Define the exact standard of protection of any realigned defences along these frontages;
- Investigate implementation methods;
- Assess hydrodynamic impacts of Managed Realignment;
- Investigate future morphological evolution;
- Assess the potential impact on internationally designated sites; and,
- Investigate any mitigation measures required for loss of any designated habitats.

Example extents have however, been identified using available information to assess the objectives, undertake the Habitats Regulations Assessment and to provide a broad scale economic appraisal of policy options. Maps of example extents used are included in **Appendix H, Annex H4**.

Theoretically the maximum extent of any realignment is limited by the extent of the floodplain. However, in reality there are a number of other constraints which mean extent of any realignment is likely to be less than this. Within the present SMP, example realignment extents have therefore, been identified after considering:

- The provision of a more sustainable estuary alignment;
- The avoidance of built assets, infrastructure and internationally designated habitats where practicable;
- The provision of more economic, shorter and sheltered defences, incorporating high land where possible;
- The creation of intertidal habitat; and,
- The potential effects on estuary dynamics.
- It should again be noted that these are indicative extents and the actual realignment extent along any frontage where Managed Realignment has been proposed will be the subject of further studies before any realignment scheme is undertaken.

There should be detailed consideration of future land use, development and infrastructure improvements in all areas of flood and erosion risk, particularly where the policy is not Hold the Line, to enable the shoreline, and the assets affected by it, to adapt in a sustainable, controlled and balanced way.

Economic Viability

It should be noted that a proposed policy of Hold the Line does not guarantee funding for defence maintenance and / or capital works along these sections of the shoreline.

Location reference:	**Grain Tower to Colemouth Creek**
Policy Unit reference:	**E4 01**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The Grain Tower to Colemouth Creek frontage is located on the eastern extremity of the Isle of Grain and marks the interface between the Medway Estuary and the open coast (Policy Unit 4a 01: All Hallows-on-Sea to Grain – Isle of Grain to South Foreland, SMP2. The preferred policies for this adjacent open coast unit are Hold the Line in the short term, followed by Managed Realignment in the medium and long terms). A small narrow shingle beach is located to the north of Grain Tower, fronted by wide tidal mudflats; elsewhere intertidal habitat to the east and south of the frontage is internationally designated. Grain village is located on an area of higher land to the north whilst the majority of the shoreline is dominated by nationally important industry (e.g. Grain Power Station and Thamesport Container Terminal). The former oil refinery site also located on this frontage is a proposed Thames Gateway economic regeneration site.

The plan in the long term is to protect these major commercial and industrial assets and associated infrastructure and avoid any potential contamination risks. Were the commercial and industrial assets to cease operation and the Power Station to be decommissioned then the policy for this unit should be revisited, as managed realignment to widen the Medway estuary mouth would benefit future estuary management. From the best available information, the importance of the assets in this area will continue in place for the life of the plan and a Hold the Line Policy is preferred for all epochs.

Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for North Grain to Colemouth Creek is to **hold the line.** This will be achieved by continuing to maintain the revetments and seawalls around the commercial and industrial assets.

The evolution of intertidal areas will be dependent on sediment supply. Sediment availability in the Medway is expected to keep pace with need during this epoch. Therefore mudflats to the south of the frontage are predicted to remain stable whilst intertidal habitats in the more confined channel locations to the east will continue to be subject to erosion.

Medium-term: The medium term policy is to **hold the line.** In response to sea level rise it is anticipated that the defences will require additional maintenance and potentially upgrading as they become more vulnerable to wave attack and rising water

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Grain Tower to Colemouth Creek**
Policy Unit reference:	**E4 01**

	levels. Intertidal areas are predicted to continue to evolve as per the previous epoch.
Long-term:	The long term policy is to **hold the line** and protect the commercial, industrial and infrastructure assets along the frontage. This will be achieved by maintaining and upgrading defences throughout this epoch. Tidal mudflats fronting defences along this frontage will become subject to increased erosion throughout this epoch as water levels rise, water flows increase, and sediment supply decreases.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Grain Tower to Colemouth Creek***
Policy Unit reference:	***E4 01***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to material assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat due to coastal squeeze in confined channel locations. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials"	Coastal artillery Defences SM will remain protected. Potential loss of unknown heritage buried in intertidal zone.	Defences will continue to provide the appropriate standard of protection to built assets during this period. Footpaths will remain.
20-50	Undertake engineering	Defences will continue to	Designated landscape of	Effect on internationally	Coastal artillery Defences	Defences will continue to

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Location reference:	***Grain Tower to Colemouth Creek***
Policy Unit reference:	***E4 01***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
years	works to hold the defence line.	provide the appropriate standard of protection to material assets, infrastructure and agricultural land during this period.	the industrial area maintained but with increased defences. Larger defences may affect landscape character.	designated intertidal habitat and nationally important (BAP) habitat due to coastal squeeze in confined channel locations. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials"	SM will remain protected. Potential loss of unknown heritage buried in intertidal zone.	provide the appropriate standard of protection to built assets during this period. Footpaths will remain.
50-100 years	Undertake engineering works to hold the defence	Defences will continue to provide the appropriate	Designated landscape of the industrial area	Effect on internationally designated intertidal habitat	Coastal artillery Defences SM will remain protected.	Defences will continue to provide the appropriate

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Location reference:	***Grain Tower to Colemouth Creek***
Policy Unit reference:	***E4 01***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
	line.	standard of protection to material assets, infrastructure and agricultural land during this period.	maintained but with increased defences. Larger defences may affect landscape character.	and nationally important (BAP) habitat due to coastal squeeze in confined channel locations. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials"	Potential loss of unknown heritage buried in intertidal zone.	standard of protection to built assets during this period. Footpaths will remain.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Colemouth Creek to Bee Ness Jetty**
Policy Unit reference:	**E4 02**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Nationally important infrastructure (road, railway, pipelines and electricity cables) associated with industry on the Isle of Grain (Policy Unit E4 01), is located close to the shoreline along the length of this frontage. The residential communities of Lower Stoke and Middle Stoke primarily lie on higher land; however, some areas are vulnerable to flooding. The estuary is wider than the ideal form in this location and consequently a large area of saltmarsh (Stoke Saltings) continues to develop between Colemouth Creek and the Bee Ness Jetty. The intertidal area and some sections of freshwater habitat bounding this unit are internationally designated for their ecological importance. The growth of intertidal habitat in this policy unit is very important in maintaining the internationally designated habitat.

The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide appropriate flood and erosion defence to the nationally important infrastructure crossing the floodplain and most of the defended hinterland. This section of shoreline provides a resource of growing intertidal habitat and is an ideal location for environmental enhancements and habitat creation through localised managed realignments.

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The future management of this unit will work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst controlling coastal flooding and erosion to key assets and, at the same time, creating a more economically and technically viable shoreline position.

Should current sea level rise predications be realised, a further realignment to align with the Isle of Grain to South Foreland SMP2 Policy Unit 4a01 in the last epoch may enable better estuary management. Any proposals for land use change, new development and infrastructure provision or replacement should be designed to take account of possible larger realignment of the estuary across the coastal plain in the 3rd epoch.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference: **Colemouth Creek to Bee Ness Jetty**

Policy Unit reference: **E4 02**

Preferred policies to implement Plan:

From present day: The present day policy is managed realignment with localised hold the line for Colemouth Creek to Bee Ness Jetty. This will be implemented by maintaining the current defence line along the part of the frontage and by constructing new realigned secondary defences in localised areas at a set-back position, ensuring continued protection to infrastructure. Some shoreline paths would have to be re-routed in localised areas.

No specific realignment positions have been identified for the SMP, however realigned defences will be shorter in length than current defences and so be more economically viable and sustainable in the longer term. However, set back may affect small areas of designated freshwater habitat, dependant on realignment extents. The effect on freshwater habitats would require mitigation / compensation measures to be implemented, and this aspect will require more detailed appraisal.

The evolution of intertidal areas will be dependant on sediment supply. It is predicted that intertidal areas will continue to experience net accretion as sediment supply is expected to be able to meet demand throughout this epoch.

Medium-term: The medium term policy is to continue allowing the shoreline to evolve naturally in sections, whilst continuing to provide protection to infrastructure and low lying areas, under a policy of **managed realignment with localised hold the line**. Defences will require further maintenance throughout this period as sea levels rise. However, the increased saltmarsh and intertidal area, in sections where defences are set-back, will afford added protection to the hinterland and reduce maintenance costs to the set back defences. Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environment benefits and limit any potentially negative habitat impacts.

It is predicted that intertidal areas will continue to experience net accretion as sediment supply is expected to be able to meet demand throughout this epoch. However, erosion may become more prevalent along the seaward edge of the saltmarshes as sea levels rise.

Long-term: The long-term policy is a continuation of **managed realignment with localised hold the line**, to enable more flexible and sustainable flood and erosion risk

Location reference:	**Colemouth Creek to Bee Ness Jetty**
Policy Unit reference:	**E4 02**

management within the estuary. All defences will require periodic maintenance and potential upgrading with sea level rise. Should current sea level rise predications be realised, a further realignment to align with the Isle of Grain to South Foreland SMP2 Policy Unit 4a01 may enable better estuary management. Any proposals for land use change, new development and infrastructure provision or replacement should be designed to take account of possible larger realignment of the estuary across the coastal plain in the 3rd epoch.

It is expected that created habitat in realigned areas will become well-established during this epoch and provide added protection to the hinterland. However, elsewhere coastal squeeze may become more prevalent as sea levels rise and sediment supply in the Medway decreases over this epoch.

Location reference:	***Colemouth Creek to Bee Ness Jetty***
Policy Unit reference:	***E4 02***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will continue to provide the appropriate level of protection to infrastructure and most areas of agricultural land Areas of Grade 4 land affected by managed realignment will become intertidal. Any proposals for changes in land use and new or replacement assets should be designed to account for larger change in the third epoch.	Designated estuary landscape will be maintained however some features will change through Realignment.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Creation of internationally and nationally important saltmarsh habitat. Effect on small areas of internationally designated coastal grazing marsh and nationally important (BAP) habitat, dependant on realignment extent. Compensatory habitat will need to be secured before any designated habitat is lost.	Potential loss of buried unknown heritage.	Re-routing of footpaths where MR is implemented.
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Construct	Defences will continue to minimise the coastal erosion and flood risk to built assets, infrastructure and most areas of agricultural land	Designated estuary landscape will be maintained, potential for visual enhancement with a more natural coastline as MR is established.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Establishment of realigned saline	Potential loss of buried unknown heritage.	Potential loss of wharf and Medway Micro Lights if defences realigned in these locations. Re-routing of footpaths where MR is implemented.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Colemouth Creek to Bee Ness Jetty***
Policy Unit reference:	***E4 02***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
	secondary defences in suitable realignment locations	Potential of further loss of land if defences realigned further.		habitat. Potential further affect on internationally designated coastal grazing marsh and nationally important (BAP) habitat, if defences realigned further.		
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Construct secondary defences in suitable realignment locations.	Defences will continue to minimise the coastal erosion and flood risk to built assets, infrastructure and most areas of agricultural land Potential of further loss of land if defences realigned further.	Designated estuary landscape will be maintained, potential for visual enhancement with a more natural coastline as MR is established.	Potential effect on internationally designated intertidal habitats and nationally important (BAP) habitat with coastal squeeze, as sediment supply decreases in the estuary. Establishment of habitat in realigned areas. Potential further effect on internationally designated coastal grazing marsh and nationally important (BAP) habitat, if defences realigned further.	Potential loss of buried unknown heritage.	Potential loss of wharf and Medway Micro Lights if defences realigned in these locations. Re-routing of footpaths where MR is implemented.

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Location reference:	**Kingsnorth Power Station**
Policy Unit reference:	**E4 03**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The nationally important Power Station and associated infrastructure dominating this frontage is protected by revetted embankments along the majority of the frontage. Jetties from the Power Station stretch out into the estuary and extend over a number of small islands. Permission has been granted for a larger Power Station to be built in this location. The wide intertidal mudflats and saltmarsh along the frontage, including Oakham Marsh Island are internationally designated.

The plan in the long term is to protect this major asset and avoid any potential contamination risks. Were the station to cease operation and be decommissioned, the policy for this unit should be revisited. The preferred plan also reduces flooding risk to adjacent low lying areas.

Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day:	The present day policy for Kingsnorth Power Station is to **hold the line.** This will be achieved by continuing to maintain the defences around the nationally important asset and associated infrastructure. As sediment supply within the estuary is expected to meet demand throughout this epoch, intertidal mudflat and saltmarsh evolution is predicted to continue with erosion in some areas (e.g. Oakham Marsh Island), increasing pressure on defences, and accretion in others.
Medium-term:	The medium term policy is to **hold the line.** In response to sea level rise it is anticipated that defences will require additional maintenance and potentially upgrading at some time within this epoch to continue protection of this important infrastructure feature. Intertidal areas are predicted to continue to evolve as per the previous epoch.
Long-term:	The long term policy is to **hold the line** and protect the Power Station frontage and low-lying assets on the hinterland. There will be an increased potential for erosion of intertidal areas with sea level rise, due to coastal squeeze as natural channel processes are restricted by defences, and as sediment supply

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Location reference:	**Kingsnorth Power Station**
Policy Unit reference:	**E4 03**

decreases.

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Location reference:	***Kingsnorth Power Station***
Policy Unit reference:	***E4 03***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potential"	Potential loss of unknown heritage buried in intertidal zone.	No loss of properties or community facilities in Hoo St Werburgh. No recreation and amenity issues relating to this industrial coastal unit.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure	Designated landscape of the industrial area maintained but with increased defences.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze,	Potential loss of unknown heritage buried in intertidal zone.	No recreation and amenity issues relating to this industrial coastal unit.

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		and agricultural land during this period.	Larger defences may affect landscape character.	loss will occur in some areas as will accretion elsewhere. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potential"		
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	Potential affect on internationally designated intertidal habitats and nationally important (BAP) habitat with coastal squeeze, as sediment supply decreases in the estuary. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water	Potential loss of unknown heritage buried in intertidal zone.	No recreation and amenity issues relating to this industrial coastal unit.

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				ecological status/potential"		

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Location reference:	**Kingsnorth Power Station to Cockham Wood**
Policy Unit reference:	**E4 04**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Wide intertidal mudflats and saltmarsh of international importance extend along the frontage, whilst the majority of the hinterland comprises low-lying undeveloped coastal grazing marsh and agricultural land, some of which is nationally and internationally designated for its ecological value. A marina and small residential community, south of Hoo St Werburg, are located at the western extremity of the frontage. An onshore mineral extraction operation and habitat restoration scheme has been proposed to the west of Kingsnorth Power Station. The Saxon Shore Way extends along the shoreline along the west of the frontage before moving inland.

The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood defence to the Kingsnorth Power Station, Hoo Marina, residential communities and some areas of backing low-lying land. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancements and habitat creation through localised managed realignment.

No specific realignment positions have been identified for the SMP. The outcome of geomorphological and ecological studies plus the management of the designated European Wildlife sites will define the extent, location and implementation of the realignment and achieve. the best technical, environmental and economic option. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day: The present day policy for Kingsnorth Power Station to Cockham Wood is **managed realignment with localised hold the line**.and the European Wildlife site. The current defence line would be maintained along some sections of the frontage and new realigned secondary defences constructed at a set-back position, ensuring continued protection to built and environmental assets. Some shoreline paths would have to be re-routed in localised areas,

No specific realignment positions have been identified for the SMP. However, an affect on designated freshwater habitat may occur, dependant on

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Location reference:	**Kingsnorth Power Station to Cockham Wood**
Policy Unit reference:	**E4 04**

realignment extents. Loss of designated freshwater habitats would require mitigation / compensation measures to be implemented, and this aspect will require more detailed appraisal.

Evolution of intertidal areas will be dependant on sediment supply. It is predicted that sediment supply is expected to meet demand throughout this epoch, therefore intertidal areas will continue to be stable along the majority of frontage. However, net erosion is expected to continue in the narrow channel between Hoo Marina and Hoo Saltmarsh Island.

Medium-term:

The medium term policy is to continue allowing the shoreline to realign in sections, albeit in a controlled manner, whilst continuing to provide protection to assets and low lying areas, under a policy of **managed realignment with localised hold the line**. Defences may require further maintenance throughout this period as sea levels rise. However, the increased saltmarsh and intertidal area, in sections where defences are set-back, will afford added protection to the hinterland. Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests in realigned areas. This may require specific management to maximise the environment benefits and limit any potential habitat impacts.

It is predicted that intertidal areas will continue to be stable along most of the frontage as sediment supply is expected to be able to meet demand throughout this epoch. However, coastal squeeze may become more prevalent along Hoo Marina frontage as sea levels rise. As intertidal areas narrow, defences in this area may become more susceptible to undermining and therefore may require upgrading.

Long-term:

The long-term policy is a continuation of **managed realignment with localised hold the line**, to enable more flexible and sustainable flood and erosion risk management within the estuary. All defences will require periodic maintenance and potential upgrading.

It is expected that created habitat in realigned areas will become well-established during this epoch and provide added protection to the hinterland. However, elsewhere coastal squeeze may become more prevalent as sea levels rise and sediment supply in the Medway decreases over this epoch.

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Location reference:	***Kingsnorth Power Station to Cockham Wood***
Policy Unit reference:	***E4 04***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will provide an appropriate level of protection to the marina. Areas of land affected by managed realignment will become intertidal. Protection of Kingsnorth Power Station.	Designated estuary landscape will be maintained however some features will change through realignment.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Creation of internationally and nationally important saltmarsh habitat in realigned areas. Affect on small areas of internationally designated coastal grazing marsh and nationally important (BAP) habitat, dependant on realignment extent. Compensatory habitat will need to be secured before any designated habitat is lost. Managed realignment will result in future changes to habitat drained by Damhead Creek due to tidal flooding, and will contribute to WFD objective 2 ”no changes that will cause failure	Potential loss of buried unknown heritage.	Defences will provide an appropriate level of protection to residential development. Re-routing of footpaths where MR is implemented.

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Location reference:	***Kingsnorth Power Station to Cockham Wood***
Policy Unit reference:	***E4 04***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/ potentials" by accepting a sustainable change in this river water body.		
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintain the realigned defence line.	Defences will provide an appropriate level of protection to the marina and residential areas. Areas of land affected by managed realignment will become established intertidal areas.	Designated estuary landscape will be maintained, potential for visual enhancement with a more natural coastline as MR is established.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Establishment of new habitats in realigned areas. Potential further affect on coastal grazing marsh and nationally important (BAP) habitat, if defences realigned further. Managed realignment will result in future changes to habitat drained by Damhead Creek due to tidal flooding, and will contribute to WFD objective	Potential loss of buried unknown heritage.	No loss of recreational or community assets.

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Location reference:	***Kingsnorth Power Station to Cockham Wood***
Policy Unit reference:	***E4 04***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				2 ”no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/ potentials” by accepting a sustainable change in this river water body.		
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintain the realigned defence line.	Defences will provide an appropriate level of protection to the marina and residential areas. Areas of land affected by managed realignment will become established intertidal areas.	Designated estuary landscape will be maintained, potential for visual enhancement with a more natural coastline as MR is established.	Potential effect on internationally designated intertidal habitats and nationally important (BAP) habitat with coastal squeeze, as sediment supply decreases in the estuary. Establishment of habitats in realigned areas. Potential further effect on coastal grazing marsh and nationally important (BAP) habitat, if defences realigned further. Managed realignment will result in future changes to habitat drained by Damhead Creek due to tidal flooding,	Potential loss of buried unknown heritage.	No loss of recreational or community assets.

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Location reference:	***Kingsnorth Power Station to Cockham Wood***
Policy Unit reference:	***E4 04***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				and will contribute to WFD objective 2 ”no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/ potentials” by accepting a sustainable change in this river water body.		

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Location reference:	**Cockham Wood**
Policy Unit reference:	**E4 05**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Undeveloped coppice at Cockham Wood extends along the shoreline and over soft clay cliffs, which are of national biological and geological importance respectively. The woodland, also designated for its landscape value, is fronted by narrow areas of grass, beach and then intertidal mudflat. The only built asset along this frontage is Cockham Wood Fort, a nationally important heritage asset, parts of which are being actively eroded by the river. The Saxon Shore Way extends along the frontage close to the shore, from Lower Upnor in the west to Hoo Marina in the east. The shoreline of this unit is not currently defended.

The long term policy for this unit is to maintain landscape value of the frontage by allowing the continuation of natural erosion and rollback of the shoreline. It is considered unsustainable and uneconomic to protect the heritage feature in the long term.

Preferred policies to implement Plan:

From present day: The present day policy for Hoo Marina to Lower Upnor is to continue allowing natural processes to operate i.e. rollback of the narrow beach, under a **no active intervention** policy. This will maintain the landscape value and will result in a naturally functioning shoreline. The heritage asset will, however, continue to be exposed and actively eroded over time. It may therefore be prudent to consider additional monitoring and recording of the heritage interests.

Medium-term: The medium term policy is to continue allowing natural processes to operate under a policy of **no active intervention**. The Saxon Shore Way will become inundated more often and the integrity of the heritage feature will be increasingly threatened as sea levels rise. Note that there is an alternative route to the Saxon Shore Way which extends inland along this frontage which will remain. The rising land along this frontage will limit landward migration of intertidal habitat and may ultimately lead to coastal squeeze.

Long-term: The long term policy for Cockham Wood is **no active intervention**. This policy will allow the shoreline to continue to function and evolve freely, maintaining the landscape value. It is anticipated that Cockham Wood Fort and the footpath will be at increased risk from erosion during this period as sea levels rise, with the potential for eventual loss of the features. It is considered that protection of these features is not viable on economic or environmental grounds.

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Location reference:	***Cockham Wood***
Policy Unit reference:	***E4 05***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Natural erosion will continue.	Damage to / erosion of built heritage asset.	Landscape maintained.	Allows natural processes to operate along the frontage. There is predicted to be no adverse impacts on the habitat. The stratigraphic features of Tower Hill to Cockham Wood SSSI will continue to be exposed and work with natural processes.	Damage to / erosion of Cockham Wood Fort SM. Potential loss of buried unknown heritage.	It will become increasingly difficult to access the foreshore route of the Saxon Shore Way as shoreline retreats naturally; however, the alternative inland route of Saxon Shore Way is not compromised.
20-50 years	Natural erosion will continue.	Damage to / erosion of built heritage asset.	Landscape maintained.	Narrowing of beach with coastal squeeze, therefore some affect on nationally important (BAP) habitat. The stratigraphic features of Tower Hill to Cockham Wood SSSI will continue to be exposed and work with natural processes.	Damage to / erosion of Cockham Wood Fort SM. Potential loss of buried unknown heritage.	Limited access to the foreshore route of the Saxon Shore Way. However, the alternative inland route of Saxon Shore Way is not compromised.
50-100 years	Natural erosion will continue.	Loss of built heritage asset.	Landscape maintained.	Narrowing of beach with coastal squeeze, therefore	Loss of Cockham Wood Fort SM.	Limited access to the foreshore route of the

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Location reference:	***Cockham Wood***
Policy Unit reference:	***E4 05***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				some effect on nationally important (BAP) habitat. Initiation of cliff erosion, therefore impact on nationally designated site and nationally important (BAP) habitat. The stratigraphic features of Tower Hill to Cockham Wood SSSI will continue to be exposed and work with natural processes.	Potential loss of buried unknown heritage.	Saxon Shore Way. However, the alternative inland route of Saxon Shore Way is not compromised.

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Location reference:	**Lower Upnor to Medway Bridge**
Policy Unit reference:	**E4 06**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

A dense urban area extends to the shoreline along the majority of the unit, consisting of the residential areas of Lower Upnor, Frindsbury and Strood, the commercial and industrial area of the Medway City Estate and regionally important strategic links. Strood has been identified as a key regeneration area under the Medway Waterfront Renaissance Strategy. The eastern section of frontage, however, is less densely urbanised and is made up of smaller residential areas interspersed with recreational and nationally important heritage features.

The long term plan is to continue protecting the developments including the residential, commercial, industrial and heritage assets from flooding and erosion. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for Lower Upnor to Medway Bridge is to continue to **hold the line** by maintaining and improving the existing defence to protect the significant assets contained within the towns of Frindbury, Strood and Lower Upnor; including assets and infrastructure important to the regional economy. This will be achieved by continuing to maintain the existing defences, which consist of seawalls and revetments. Intertidal areas are likely to be stable in this area, therefore there is expected to be very little change in estuary processes or impacts on evolution occurring within this epoch.

Medium-term: The medium term policy is to continue to **hold the line**. To maintain the standard of protection there will be a need to upgrade the defence structures at some point during this epoch. This will protect the built assets from sea level rise. However, the constrained channel, intertidal areas and defences will become increasingly subject to erosion due to increased water levels and fluvial flows making defences more expensive to construct.

Long-term: The significant built assets along this frontage dictate that the long-term policy is to **hold the line**. To accomplish this and to keep pace with sea level rise defences will need to be maintained and upgraded. The increased tidal prism, resulting from sea level rise, coupled with increased fluvial flows from climate change, is likely to lead to the increased erosion of intertidal areas in confined

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Location reference:	**Lower Upnor to Medway Bridge**
Policy Unit reference:	**E4 06**

sections of channel making defences more expensive to construct.

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Location reference:	***Lower Upnor to Medway Bridge***
Policy Unit reference:	***E4 06***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of habitat at Temple Marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water.	Potential loss of unknown heritage buried in intertidal zone. Protection of SMs.	No loss of residential and commercial properties or recreational facilities. Opportunity to enhance recreation and amenity features.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	No loss of habitat at Temple Marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes	Potential loss of unknown heritage buried in intertidal zone. Protection of SMs	No loss of residential and commercial properties or recreational facilities. Opportunity to enhance recreation and amenity features.

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				that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water.		
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	No loss of habitat at Temple Marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water.	Potential loss of unknown heritage buried in intertidal zone. Protection of SMs	No loss of residential and commercial properties or recreational facilities. Opportunity to enhance recreation and amenity features.

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Location reference:	**Medway Bridge to North Halling**
Policy Unit reference:	**E4 07**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The railway line, located close to the shoreline, follows the line of the frontage between Medway Bridge and North Halling. The railway line separates the residential communities of Cuxton and North Halling from the narrow Medway channel. The floodplain is restricted due to the presence of the railway line.

The long term plan is to continue protecting the built assets and infrastructure from flooding and erosion. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for Medway Bridge to North Halling is **hold the line** by maintaining and upgrading existing defences to provide protection to built assets at Cuxton and North Halling and to infrastructure. Intertidal areas will remain stable as sediment supply is expected to meet demand in the Medway estuary throughout this epoch.

Medium-term: The medium term policy is to continue to **hold the line** This will be implemented by maintaining and upgrading the current defence line along the majority of the frontage, ensuring continued protection to built assets and the railway line.

As sea levels rise and fluvial flows increase with climate change, the channel may deepen and erosion may become more prevalent, especially on the outside of meanders (at North Halling) and confined areas making defences more expensive to construct.

Long-term: The long-term policy is a continuation of **hold the line**. To accomplish this and to keep pace with sea level rise, defences will require periodic maintenance and upgrading with sea level rise and increased fluvial flows, to maintain the protection of built assets. Intertidal erosion may be exacerbated in confined sections of this frontage, leading to the potential undermining of defences making defences more expensive to construct.

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Location reference:	***Medway Bridge to North Halling***
Policy Unit reference:	***E4 07***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No nature conservation issues identified. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials.	Potential loss of unknown heritage buried in intertidal zone.	No loss of recreational features or residential properties.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	No nature conservation issues identified Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD	otential loss of unknown heritage buried in intertidal zone.	No loss of recreational features or residential properties.

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				objective 2, “no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials		
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	No nature conservation issues identified. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, “no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials.	Potential loss of unknown heritage buried in intertidal zone.	No loss of recreational features or residential properties.

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Location reference:	**North Halling to Snodland**
Policy Unit reference:	**E4 08**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The meandering narrow Medway channel is bordered by the residential communities of Halling and Snodland and pockets of freshwater habitat.. The floodplain is restricted due to the presence of the railway line, which is set-back from the meandering river bank.

The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood defence to Halling and Snodland and flood risk areas. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancements and habitat creation through localised managed realignment.

No specific realignment positions have been identified for the SMP. Further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

Preferred policies to implement Plan:

From present day: The present day policy is managed realignment with localised hold the line for North Halling to Snodland**.** The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. This will be implemented by maintaining and upgrading the current defence line along some sections of the frontage and by constructing new realigned secondary defences ensuring continued protection to built assets. This policy will require the re-routing of footpaths in localised areas.

No specific realignment position has been identified for the SMP. However, an affect on designated freshwater habitat may occur, dependant on realignment extents. These impacts will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme.Intertidal areas will remain stable as sediment supply is expected to meet demand in the Medway estuary throughout this epoch.

Medium-term: The medium term policy is to continue allowing the shoreline to evolve naturally in places, whilst continuing to provide protection to residential communities and

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Location reference:	**North Halling to Snodland**
Policy Unit reference:	**E4 08**

low lying areas, under a policy of **managed realignment with localised hold the line.** Defences will require further maintenance and potentially upgrading throughout this period as sea levels rise and fluvial flows increase with climate change. Consequently, the channel may deepen and erosion may become more prevalent, especially on the outside of meanders (at Halling and Snodland) and within confined areas. Managed realignment in adjacent areas may help to accommodate flood waters, reduce pressure on defences and afford added protection to the hinterland.

Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

Long-term:

The long-term policy is a continuation of **managed realignment with localised hold the line**, to enable more flexible and sustainable flood and erosion risk management within the estuary. Defences will require periodic maintenance and upgrading (potentially at Halling and Snodland) with sea level rise and increased fluvial flows, to maintain protection of built assets and flood risk areas. It is expected that created habitat will become well-established during this epoch. Intertidal erosion may be exacerbated in confined sections of this frontage, leading to the potential undermining of defences. However, areas of realignment may continue to reduce pressure in these locations.

Location reference:	***North Halling to Snodland***
Policy Unit reference:	***E4 08***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will provide an appropriate level of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on current and future commercial traffic in the estuary.	Designated estuary landscape will be maintained, however, some features will change through realignment. Potential for a more 'natural' shoreline.	Dependant on MR extent, potential affect on grazing marsh and nationally important (BAP) habitat at Halling, pasture at Snodland and nationally designated freshwater marshes and nationally important (BAP) habitat at Holborough Marshes. Transition of habitats from freshwater to brackish to saline in realigned areas. Potential for contamination of water resources under a managed realignment policy. Managed realignment will result in future changes to habitat drained by at tributary of the Medway Estuary at Holborough, due to tidal flooding, and	No loss of SMs. Potential loss of buried unknown heritage.	Re-routing of footpaths where MR is implemented.

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Location reference:	***North Halling to Snodland***
Policy Unit reference:	***E4 08***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				will contribute to WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials" by accepting a sustainable change in this river water body.		
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintain secondary defence line.	Defences will provide an appropriate level of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the estuary.	Designated estuary landscape will be maintained, however, some features will change through realignment. Potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. Potential for contamination of water resources under a managed realignment policy. Managed realignment will result in future changes to habitat drained by at	No loss of SMs. Potential loss of buried unknown heritage.	No loss of recreational features.

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Location reference:	***North Halling to Snodland***
Policy Unit reference:	***E4 08***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				tributary of the Medway Estuary at Holborough, due to tidal flooding, and will contribute to WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials" by accepting a sustainable change in this river water body.		
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Construct secondary defences in suitable realignment locations.	Defences will provide an appropriate level of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained, however, some features will change through realignment. Potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. Potential for contamination of water resources under a managed realignment policy.	No loss of SMs. Potential loss of buried unknown heritage.	No loss of recreational features.

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Location reference:	***North Halling to Snodland***
Policy Unit reference:	***E4 08***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
		MR may impact on future commercial traffic in the estuary.		Managed realignment will result in future changes to habitat drained by at tributary of the Medway Estuary at Holborough, due to tidal flooding, and will contribute to WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials" by accepting a sustainable change in this river water body.		

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Location reference:	**Snodland to Allington Lock**
Policy Unit reference:	**E4 09**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The hinterland is characterised by an area of nationally designated low-lying freshwater lakes (Leybourne Lakes) south of Snodland and urban communities along the remaining frontage towards Allington Lock. The railway line extends along the whole of the frontage, and is located close to the shoreline near to historic Aylesford. The estuary channel is fluvial in form and narrows considerably as it meanders south to Allington Lock.

In the short to medium term the plan is to continue protecting the freshwater habitats, built assets and flood risk areas. During this time studies will be undertaken to investigate and define the exact standard and alignment of the managed realignment in the long term.

The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish habitat in some locations, whilst continuing to provide flood defence to remaining urban and environmental assets and flood risk areas. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancement and habitat creation through localised managed realignment.

No specific realignment positions have been identified for the SMP. Further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage

The aim of this policy is to enable more flexible and sustainable flood and erosion risk management within the estuary by working towards achieving a more naturally functioning estuary. This will create important brackish and saline habitats whilst at the same time creating a shoreline that has reduced defence maintenance costs.

Preferred policies to implement Plan:

From present day: The present day policy for Snodland to Allington Lock is **hold the line** by maintaining existing defences to provide protection to the urban areas, economic and heritage assets, infrastructure and freshwater habitats. Intertidal areas will remain stable as sediment supply is expected to meet demand in the Medway estuary throughout this epoch.

Maintaining the existing defence line in the short term will allow further studies to be conducted, regarding the viability of managed realignment in multiple areas along the section of the Medway between Medway Bridge and Allington Lock.

Location reference:	**Snodland to Allington Lock**
Policy Unit reference:	**E4 09**

Medium-term:

The medium term policy changes to managed realignment with localised hold the line. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will be implemented by maintaining and upgrading the current defence line along the majority of the frontage and by constructing new realigned secondary defences at a set-back position, ensuring continued protection to built and environmental assets. This will require re-routing of shoreline footpaths in localised areas.

No specific realignment positions have been identified for the SMP. However, an affect on designated freshwater habitat may occur, dependant on realignment extents. These impacts will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme.

Long-term:

The long term policy is to continue allowing the shoreline to realign in places, whilst continuing to provide protection to assets and low lying areas, under a policy of **managed realignment with localised hold the line.** Defences will require further maintenance and potentially upgrading throughout this period as sea levels rise and fluvial flows increase due to climate change. Consequently, the channel may deepen and erosion may become more prevalent, especially on the outside of meanders and in confined areas. Managed realignment in adjacent areas may help to accommodate flood waters and reduce pressure on defences in these locations.

Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

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Location reference:	***Snodland to Allington Lock***
Policy Unit reference:	***E4 09***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of designated habitats. Potential for contamination of water resources under a managed realignment policy.	No loss of Aylesford Bridge SM or damage to Aylesford Conservation Area.	Protection ot properties No loss of recreation features.
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the estuary.	Designated estuary landscape will be maintained. However, some features will change through realignment. Potential for a more 'natural' shoreline.	Dependant on MR extent, potential effect on nationally designated wetland and nationally important (BAP) habitat at Abbey Mead Lake. Transition of habitats from freshwater to brackish to saline in realigned areas. Potential for contamination of water resources under a managed realignment policy.	No loss of Aylesford Bridge SM or damage to Aylesford Conservation Area.	Protection ot properties Re-routing of footpaths where MR is implemented.
50-100 years	Undertake engineering works to defences to Hold the Line of sections of	Defences will continue to provide the appropriate standard of protection to	Designated estuary landscape will be maintained, however,	Establishment of brackish and saline habitats in realigned areas.	No loss of Aylesford Bridge SM or damage to Aylesford Conservation Area.	Protection ot properties No loss of recreation

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	defences protecting key assets. Maintain the realigned defence line.	built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the estuary.	some features will change through realignment. Potential for a more 'natural' shoreline.	Potential for contamination of water resources under a managed realignment policy.		features.

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Location reference:	**Allington Lock to North Wouldham**
Policy Unit reference:	**E4 10**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The frontage comprises the urban areas of historic Aylesford and Millhall to the south and areas of agricultural land and freshwater habitats interspersed with small settlements towards the north. Outline planning consent has been granted to a housing and community development (Peters Village) and a new Medway River crossing west of Peters Pit. The estuary channel is narrow and fluvial in form along the whole frontage.

In the short to medium term the plan is to continue protecting the environmental habitats, agricultural land, built assets and flood risk areas. This will allow further studies to consider the viability of multiple areas of managed realignment along the frontage and to define the exact standard and alignment of defences for this frontage. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish habitat in some locations, whilst continuing to provide flood defence to remaining urban and environmental assets and flood risk areas. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancement and habitat creation through localised managed realignment.

No specific realignment positions have been identified for the SMP. Further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

Preferred policies to implement Plan:

From present day: The present day policy for Allington Lock to North Wouldham is **hold the line** by maintaining existing defences to provide protection to residential, economic and heritage assets, agricultural land and freshwater habitats. Intertidal areas will remain stable as sediment supply is expected to meet demand in the Medway estuary throughout this epoch.

Maintaining the existing defence line in the short term will allow further studies to examine the viability of managed realignment in multiple areas along the section of the Medway between Medway Bridge and Allington Lock.

Medium-term: The medium term policy changes to **managed realignment with localised hold the line**. The detailed alignment, will be subject to further study to

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Location reference:	**Allington Lock to North Wouldham**
Policy Unit reference:	**E4 10**

address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will be implemented by maintaining and upgrading the current defence line along the majority of the frontage and by constructing new realigned secondary defences at a set-back position, ensuring continued protection to built and environmental assets. This will require re-routing of shoreline footpaths in localised areas. Localised managed realignment will allow some inundation and will help reduce the probability of uncontrolled large scale flooding.

No specific realignment positions have been identified for the SMP. However, an affect on designated freshwater habitat may occur, dependant on realignment extents. These impacts will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme.

Long-term:

The long term policy is to continue allowing the shoreline to realign in places, whilst continuing to provide protection to assets and low lying areas, under a policy of **managed realignment with localised hold the line.** Defences will require further maintenance and potentially upgrading throughout this period as sea levels rise and fluvial flows increase with climate change. Consequently, the channel may deepen and erosion may become more prevalent, especially on the outside of meanders and in confined areas. However, managed realignment in adjacent areas may help to accommodate flood waters and reduce pressure on defences in these locations.

Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

Location reference:	***Allington Lock to North Wouldham***
Policy Unit reference:	***E4 10***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of designated habitats. Protection of freshwater habitats and rough grassland at SNCI and marshes	No loss of Aylesford Bridge SM or damage to Aylesford Conservation Area.	Defences will continue to provide the appropriate standard of protection to built assets. No loss of recreation features.
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the estuary.	Designated estuary landscape will be maintained. However, some features will change through realignment. Potential for a more 'natural' shoreline.	Dependant on MR extent, potential effect on nationally designated freshwater habitat and nationally important (BAP) habitat at Burham. Transition of habitats from freshwater to brackish to saline in realigned areas.	No loss of SMs or damage to Aylesford Conservation Area.	Defences will continue to provide the appropriate standard of protection to built assets. Re-routing of footpaths – Medway Valley Walk where MR is implemented.
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key	Defences will continue to provide the appropriate standard of protection to built assets and	Designated estuary landscape will be maintained, however, some features will change	Establishment of brackish and saline habitats in realigned areas.	No loss of SMs or damage to Aylesford Conservation Area.	No loss of recreation features.

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	assets. Maintain realigned defences.	infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the estuary.	through realignment. Potential for a more 'natural' shoreline.			

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Location reference:	**Wouldham Marshes**
Policy Unit reference:	**E4 11**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

A low-lying area between the village of Wouldham and the Medway Bridge, rising to higher land. A small number of properties are located on the higher ground. The whole frontage is designated as an Area of Outstanding Natural Beauty.

The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the Medway Bridge, the village of Wouldham and isolated properties. It is recognised that Managed realignment may be need to extend to the raised topography of the hinterland to be affordable. However a managed realignment policy is recommended to enable better control of estuarine morphology and to provide an opportunity for habitat creation in line with the Habitats Regulations Assessment.

No specific realignment positions have been identified for the SMP. Further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. This policy is considered to be sustainable in the long-term, on the basis that overall flood defence is maintained to limit erosion and flood propagation.

Preferred policies to implement Plan:

From present day:	The present day policy is **managed realignment** for Wouldham Marshes**.** The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy would be achieved by constructing secondary defences at a set-back position and allow the existing defences to fail. The presence of raised topography behind the flood plain, and the likely increasing cost of maintaining the existing alignment, makes this appropriate. Re-routing of shoreline footpaths may be required in localised areas. As the coastline realigns, intertidal habitat will develop in the realigned area. Generally, mudflat and saltmarsh evolution in the channel is predicted to remain stable.
Medium-term:	The medium term policy is to continue allowing the shoreline to realign, under a policy of **managed realignment**. Defences will require further maintenance

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Location reference:	**Wouldham Marshes**
Policy Unit reference:	**E4 11**

throughout this period to provide continued protection to assets. Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace the freshwater habitats. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

Long-term:

The long-term policy is a continuation of **managed realignment**, to enable more flexible and sustainable flood and erosion risk management within the estuary. Defences will require periodic maintenance and potential upgrading with sea level rise. Under a scenario of sea level rise and climate change, fluvial flows and water levels will increase, leading to the increased potential for erosion in confined areas of the estuary. However, managed realignment may help to accommodate flood waters, reduce pressure on adjacent defences and give added protection to the hinterland.

It is expected that created habitat will become well-established during this epoch.

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Location reference:	***Wouldham Marshes***
Policy Unit reference:	***E4 11***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on current and future commercial traffic in the estuary.	Designated estuary landscape will be maintained, however, some features will change through realignment. Potential for a more 'natural' shoreline. Overall AONB landscape value maintained.	Effect on freshwater grazing marsh. Transition of habitats from freshwater to brackish to saline in realigned areas.	Potential loss of buried unknown heritage.	Re-routing of footpaths where MR is implemented.
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and maintain realigned defences.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the estuary.	Potential for a more 'natural' shoreline. Overall AONB landscape value maintained.	Establishment of brackish and saline habitats in realigned areas.	Potential loss of buried unknown heritage.	No loss of recreation features.

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Location reference:	***Wouldham Marshes***
Policy Unit reference:	***E4 11***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and maintain realigned defences.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the estuary.	Potential for a more 'natural' shoreline. Overall AONB landscape value maintained.	Establishment of brackish and saline habitats in realigned areas.	Potential loss of buried unknown heritage.	No loss of recreation features.

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Location reference:	**Medway Bridge to West St Mary's Island**
Policy Unit reference:	**E4 12**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

This frontage is dominated by the dense urban areas of Rochester and Chatham that extend to the shoreline. The residential and commercial frontages are interspersed with a number of river crossings and strategic links between the Medway Towns and Frindsbury and Strood, reflecting that these historic towns have been a important major crossing point across the Medway since the Iron Age and Roman times. The frontage is of considerable commercial importance (e.g. Medway Port and the potential Thames Gateway regeneration area at Rochester Riverside) and is of significant international heritage importance (e.g. Chatham Historic Dockyard), which attracts large visitor numbers.

The long term plan is to continue protecting the developments including the residential, commercial, infrastructure and heritage assets from flooding and erosion. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for Medway Bridge to West St Mary's Island is to continue to **hold the line** by maintaining and improving the existing defences to protect the significant assets contained within the Medway Towns; including assets that are important to the regional economy and national heritage. This will be achieved by continuing to maintain the existing defences, which take the form of seawalls.

Intertidal areas are likely to be stable in this area, therefore there is expected to be very little change in estuary processes or impacts on evolution within this epoch.

Medium-term: The medium term policy is to continue to **hold the line**. To maintain the standard of protection, there will be a need to upgrade the defence structures at some point during this epoch. This will protect the built assets from sea level rise. However, the constrained channel, intertidal areas and defences will become increasingly subject to erosion due to increased water levels and fluvial flows making defences more expensive to construct.

Long-term: The significant built assets along this frontage dictate that the long-term policy is to **hold the line**. To accomplish this and to keep pace with sea level rise

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Location reference:	**Medway Bridge to West St Mary's Island**
Policy Unit reference:	**E4 12**

defences will need to be maintained and upgraded. The increased water levels resulting from sea level rise, coupled with increased fluvial flows from climate change will increase the potential for erosion of intertidal areas in confined sections of channel. This will, in turn, increase pressure on defences making defences more expensive to construct.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Medway Bridge to west St Mary's Island***
Policy Unit reference:	***E4 12***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure.	Estuary landscape maintained but larger defences may affect character of the landscape.	No nature conservation issues identified. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials.	Potential loss of unknown heritage buried in intertidal zone. Protection of Chatham Historic Dockyard and Conservation Areas.	Protection of properties and recreational facilities. Opportunity to enhance recreation and amenity features.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure.	Estuary landscape maintained but larger defences may affect character of the landscape.	No nature conservation issues identified. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD	Potential loss of unknown heritage buried in intertidal zone.	Protection of properties and recreational facilities. Opportunity to enhance recreation and amenity features.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

				objective 2, “no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials.		
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure.	Estuary landscape maintained but larger defences may affect character of the landscape.	No nature conservation issues identified. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, “no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials.	Potential loss of unknown heritage buried in intertidal zone.	Protection of properties and recreational facilities. Opportunity to enhance recreation and amenity features.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**St Mary's Island to The Strand**
Policy Unit reference:	**E4 13**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The frontage is dominated by the expanding residential area of St Mary's Island and the residential, commercial and recreational areas along the Gillingham frontage, both of which extend to the shoreline. The frontage is of considerable importance for attracting visitors to its recreational areas (e.g. Gillingham Pier and Marina). The narrow Intertidal mudflats along the eastern shoreline of St Mary's Island are nationally designated, whilst the intertidal mudflat and saltmarshes along The Strand frontage are internationally designated.

The long term plan is to continue protecting these developments from flooding and erosion. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for St Mary's Island to The Strand is to continue to **hold the line** by maintaining and improving the existing defences to protect the significant assets located along the frontage; including assets that are important locally and regionally. This will be achieved by continuing to maintain the existing defences, i.e. seawalls and revetments.

Intertidal areas are likely to be stable in this area, therefore there is expected to be very little change in estuary processes or impacts on evolution within this epoch.

Medium-term: The medium term policy is to continue to **hold the line**. To maintain the standard of protection there will be a need to upgrade the defence structures at some point during this epoch. This will protect the built assets from sea level rise. However the intertidal areas and defences will become increasingly subject to erosion due to increased water levels and fluvial flows with climate change making them more expensive to manage.

Long-term: The significant built assets along this frontage dictate that the long-term policy is to **hold the line**. To accomplish this and to keep pace with sea level rise defences will need to be maintained and upgraded. The increased water levels resulting from sea level rise, coupled with increased fluvial flows from climate change will increase the potential for erosion of intertidal areas in confined

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Location reference:	**St Mary's Island to The Strand**
Policy Unit reference:	**E4 13**

sections of channel. This will, in turn, increase pressure on defences making them more expensive to manage.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***St Mary's Island to The Strand***
Policy Unit reference:	***E4 13***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".	Potential loss of unknown heritage buried in intertidal zone. Potential impacts on the historic revetments with policies of managed realignment upstream.	Protection of properties and recreational facilities along Gillingham waterfront. Opportunity to enhance recreation and amenity features.
20-50 years	Undertake engineering works to hold the defence	Defences will continue to provide the appropriate	Designated landscape of the industrial area	No net loss of internationally designated	Potential loss of unknown heritage buried in intertidal	Protection of properties and recreational facilities

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	line.	standard of protection to built assets, infrastructure and agricultural land during this period.	maintained but with increased defences. Larger defences may affect landscape character.	intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".	zone. Potential impacts on the historic revetments with policies of managed realignment upstream.	along Gillingham waterfront. Opportunity to enhance recreation and amenity features.
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	Potential effect on internationally designated intertidal habitats and nationally important (BAP) habitat with coastal squeeze, as sediment supply decreases in the estuary. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD	Potential loss of unknown heritage buried in intertidal zone. Potential impacts on the historic revetments with policies of managed realignment upstream.	Protection of properties and recreational facilities along Gillingham waterfront. Opportunity to enhance recreation and amenity features.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

				objective 2, “no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials”.		

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Location reference:	**The Strand to west Motney Hill**
Policy Unit reference:	**E4 14**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The frontage extending from The Strand to west of Motney Hill comprises an important recreation area. The Riverside Country Park, incorporating Motney Hill and Berengrave Local Nature Reserve, is backed by the B2004 road and rising land along the majority of the frontage. The Saxon Shore Way follows the shoreline along the whole of this frontage. Intertidal mudflat and saltmarshes along the frontage are internationally designated for their ecological importance.

The short term plan is to continue protecting these recreational areas from flooding and erosion, to allow further studies to investigate managed realignment with regards to infrastructure and potential contamination issues at Horrid Hill. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood and erosion defence to built assets.

No specific realignment positions have been identified for the SMP. Further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day:	The present day policy for The Strand to west Motney Hill is **hold the line** by maintaining existing defences to provide protection to the Country Park and recreational areas. Intertidal areas are likely to be stable in this area, therefore there is expected to be very little change in estuary processes or impacts on evolution within this epoch.
Medium-term:	The medium term policy changes to **managed realignment.** The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will be implemented by constructing realigned secondary defences

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Location reference:	**The Strand to west Motney Hill**
Policy Unit reference:	**E4 14**

at a set-back position, ensuring continued protection to assets. Re-routing of shoreline footpaths may be required in localised areas.

The evolution of intertidal areas will be dependant on sediment supply. However, it is predicted that intertidal areas will continue to remain stable throughout this epoch as sediment supply is expected to meet demand throughout this epoch in the Medway.

Long-term:

The long-term policy is **managed realignment** to enable more flexible and sustainable flood and erosion risk management within the estuary**.** Set-back defences will require further maintenance throughout this period as sea levels rise. However, the increased saltmarsh and intertidal area, where defences are set-back, will afford added protection to the hinterland.

Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace freshwater interests in realigned areas. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

Erosion of intertidal habitats may become more prevalent due to coastal squeeze driven by rising sea levels rise and a predicted decrease in sediment supply in the Medway estuary.

Location reference:	***The Strand to West Motney Hill***
Policy Unit reference:	***E4 14***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Potential for contamination of water resources under a managed realignment policy.	Potential loss of buried unknown heritage.	Defences will continue to protect built assets. No loss of recreational assets
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained however some features will change through realignment.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Creation of internationally and nationally important saltmarsh habitat.	Potential loss of buried unknown heritage.	Re-routing of footpaths where MR is implemented and potential loss of land within the Country Park.

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Location reference:	***The Strand to West Motney Hill***
Policy Unit reference:	***E4 14***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets. Maintain secondary defence line.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained. Potential for visual enhancement with a more natural coastline as MR is established.	Potential affect on internationally designated intertidal habitats and nationally important (BAP) habitat with coastal squeeze, as sediment supply decreases in the estuary. Establishment of habitat in realigned areas.	Potential loss of buried unknown heritage.	Potential further loss of land within the Country Park if defences realigned further.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Motney Hill to Ham Green**
Policy Unit reference:	**E4 15**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The frontage incorporates the shoreline around Motney Hill, Otterham and the western and northern edge of the Upchurch peninsular. Sections of the frontage form part of the Nor Marsh and Motney Hill RSPB Reserve. Localised settlements of Otterham, Upchurch and Ham Green are interspersed with agricultural land and freshwater marsh. Intertidal areas adjacent to the shoreline as well as areas of freshwater habitat at Motney Hill and at Horsham Marsh are nationally and internationally designated for their ecological importance.

The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system where possible, creating brackish and saline habitat in some locations, whilst continuing to provide flood and erosion defence to assets and backing low-lying land. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancement and habitat creation through localised managed realignment.

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day: The present day policy **is managed realignment with localised hold the line** for Motney Hill to Ham Green. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will be implemented by maintaining the current defence line along some of the frontage and by constructing realigned secondary defences in localised areas at a set-back position, ensuring continued protection to assets. Re-routing of shoreline footpaths will be required in localised areas.

No specific realignment position has been identified for the SMP. However, set

Location reference:	**Motney Hill to Ham Green**
Policy Unit reference:	**E4 15**

back would involve the loss of areas of designated freshwater habitat, the amount of which is dependant on the realignment extent. The loss of the designated freshwater habitats would require mitigation / compensation measures to be implemented, and this aspect will require more detailed appraisal.

The evolution of intertidal areas will be dependant on sediment supply. However, it is predicted that intertidal areas will continue to remain stable throughout this epoch as sediment supply is expected to meet demand throughout this epoch in the Medway.

Medium-term:

The medium term policy is to continue allowing the shoreline to realign in sections, whilst continuing to provide protection to assets and low lying areas, under a policy of **managed realignment with localised hold the line**. Defences will require further maintenance throughout this period as sea levels rise. However, the increased saltmarsh and intertidal area, in sections where defences are set-back, will afford added protection to the hinterland.

Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

It is predicted that intertidal areas will continue to be stable in this sheltered section of the estuary.

Long-term:

The long-term policy is a continuation of **managed realignment with localised hold the line**, to enable more flexible and sustainable flood and erosion risk management within the estuary. All defences will require periodic maintenance and potential upgrading with sea level rise.

It is expected that created habitat in realigned areas will become well-established during this epoch and provide added protection to the hinterland. However, elsewhere erosion of intertidal habitats may become more prevalent due to coastal squeeze driven by rising sea levels rise and a predicted decrease in sediment supply.

Location reference:	***West Motney Hill to Ham Green***
Policy Unit reference:	***E4 15***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained however some features will change through realignment.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Creation of internationally and nationally important saltmarsh habitat. Effect on internationally designated coastal grazing marsh and nationally important (BAP) habitat, dependant on realignment extent. Compensatory habitat will need to be secured before any designated habitat is lost. Potential for contamination of water resources under a managed realignment policy.	Potential loss of buried unknown heritage.	Defences will continue to provide protection to built assets. Re-routing of footpaths where MR is implemented.
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting	Defences will continue to provide the appropriate standard of protection to built assets and	Designated estuary landscape will be maintained. Potential for visual enhancement with	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze,	Potential loss of buried unknown heritage.	Defences will continue to provide protection to built assets.

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Location reference:	***West Motney Hill to Ham Green***
Policy Unit reference:	***E4 15***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
	key assets. Maintain secondary defences.	infrastructure. Areas of land affected by managed realignment will become intertidal.	a more natural coastline as MR is established.	loss will occur in some areas as will accretion elsewhere. Establishment of brackish / saline habitats in realigned areas. Potential further effect on coastal grazing marsh and nationally important (BAP) habitat, if defences realigned further. Potential for contamination of water resources under a managed realignment policy.		No loss of recreational assets.
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintain secondary defences.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained, potential for visual enhancement with a more natural coastline as MR is established.	Potential effect on internationally designated intertidal habitats and nationally important (BAP) habitat with coastal squeeze, as sediment supply decreases in the estuary. Establishment of habitat in realigned areas. Potential further effect on coastal grazing marsh and nationally important (BAP) habitat, if defences	Potential loss of buried unknown heritage.	Defences will continue to provide protection to built assets. No loss of recreational assets.

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Location reference:	***West Motney Hill to Ham Green***
Policy Unit reference:	***E4 15***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				realigned further. Potential for contamination of water resources under a managed realignment policy.		

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Ham Green to East of Upchurch**
Policy Unit reference:	**E4 16**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The short length of high land between Ham Green and east of Upchurch comprises Grade 1 agricultural land interspersed with isolated properties. The Saxon Shore Way follows the shoreline along the whole of this frontage. Intertidal saltmarsh and mudflat habitats seaward of defences are nationally and internationally designated for their ecological importance.

The long term policy for this unit is to allow natural erosion of the frontage as the land is elevated and there are a minimal number of built assets along this frontage. It is considered unsustainable and uneconomic to continue to protect the frontage in the long term.

Preferred policies to implement Plan:

From present day: The present day policy for Ham Green to east of Upchurch is **no active intervention,** by allowing defences to fail to allow natural processes to operate. This will maintain the ecological value of intertidal habitats and result in a free functioning shoreline.

Evolution of intertidal areas will be dependant on sediment supply. It is predicted that in this section of the estuary, saltmarsh will continue to accrete or remain stable, as sediment supply in the estuary is expected to meet demand throughout this epoch.

Medium-term: The medium term policy is to continue allowing natural processes under a policy of **no active intervention**. The shoreline will become more exposed with sea level rise and increased storminess. However, saltmarsh areas along the frontage will continue to provide a degree of protection to the undefended shoreline.

Evolution of intertidal areas will continue as per the previous epoch, remaining stable as sediment supply is expected to be able to meet demand throughout this epoch. However, erosion may become more prevalent along the seaward edge of the marshes as sea levels rise. The rising land along this frontage will limit landward migration of intertidal habitat and may ultimately lead to coastal squeeze.

The integrity of one property and greenhouses on the shoreline at Ham Green may be lost, towards the end of this epoch.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Ham Green to East of Upchurch**
Policy Unit reference:	**E4 16**
Long-term:	The long term policy is **no active intervention**. This policy will allow the shoreline to continue to function and evolve freely, maintaining the ecological value of the fronting marshes. The shoreline will be at increased risk of erosion during this period as sea levels rise and saltmarsh is eroded due to a decrease in sediment supply to the estuary. This, however, will result in the reactivation of soft cliffs along the frontage which will become an additional supply of sediment to the estuary in the long term. There is potential for the loss of the property and greenhouses at Ham Green as the shoreline erodes.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Ham Green to East of Upchurch***
Policy Unit reference:	***E4 16***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Natural erosion of defences and high land.	No loss of built assets within this epoch.	Designated landscape will be maintained.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat.	Potential loss of buried unknown heritage.	No loss of property within this epoch. Erosion may cause damage to pathway. Re-rerouting of the Saxon Shore Way.
20-50 years	Natural erosion of high land.	Loss of Grade 1 agricultural land (approximately 0.5m/yr).	Designated landscape will be maintained.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat.	Potential loss of buried unknown heritage.	Potential effect on one property and green houses at Ham Green. Erosion may lead to the loss of pathway. Rerouting of the Saxon Shoreline Way.
50-100 years	Natural erosion of high land.	Further loss of agricultural land (approximately 0.5m/yr).	Designated landscape will be maintained.	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat with coastal squeeze as sea levels rise.	Potential loss of buried unknown heritage.	Potential loss of property and green houses at Ham Green. Erosion may lead to the loss of pathway. Rerouting of the Saxon Shoreline Way.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**East of Upchurch to East Lower Halstow**
Policy Unit reference:	**E4 17**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The frontage between east Upchurch and east of Lower Halstow constitutes a relatively narrow floodplain and comprises agricultural land, locally important nature conservation sites at Upchurch and Lower Halstow Brickworks and the historically important area of Lower Halstow. Intertidal habitats along the whole frontage are nationally and internationally designated for their ecological importance.

The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system in a controlled way, creating brackish and saline habitat in some locations, whilst continuing to provide flood and erosion defence to assets and backing low-lying land. It is recognised that this section of shoreline provides an opportunity for localised environmental enhancement and habitat creation through localised managed realignment.

No specific realignment positions have been identified for the SMP. Further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any compensation measures required for loss of designated habitat.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day: The present day policy is managed **realignment with localised hold the line** for East of Upchurch to East Lower Halstow. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The current defence line would be maintained along some sections of the frontage and new realigned secondary defences constructed in localised areas at a set-back position, ensuring continued protection to assets and heritage features. Shoreline footpaths may need to be re-routed in localised areas.

Evolution of intertidal areas will be dependant on sediment supply. However, it is predicted that intertidal areas will continue to remain stable throughout this epoch as sediment supply is expected to meet demand throughout this epoch

Location reference:	**East of Upchurch to East Lower Halstow**
Policy Unit reference:	**E4 17**

in the Medway.

Medium-term:

The medium term policy is to continue allowing the shoreline to realign in sections, whilst continuing to provide protection to assets and low lying areas, under a policy of **managed realignment with localised hold the line**. Defences may require further maintenance throughout this period as sea levels rise. However, the increased saltmarsh and intertidal area, in sections where defences are set-back, will afford added protection to the hinterland.

Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

It is predicted that intertidal areas will continue to be stable in this sheltered section of the estuary.

Long-term:

The long-term policy is a continuation of **managed realignment with localised hold the line**, to enable more flexible and sustainable flood and erosion risk management within the estuary. All defences will require periodic maintenance and potential upgrading with sea level rise.

It is expected that created habitat in realigned areas will become well-established during this epoch and provide added protection to the hinterland. However, elsewhere erosion of intertidal habitats may become more prevalent due to coastal squeeze driven by rising sea levels and a predicted decrease in sediment supply.

Location reference:	***East of Upchurch to East Lower Halstow***
Policy Unit reference:	***E4 17***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Nature Conservation	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained. However, some features will change through realignment.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Creation of internationally and nationally important saltmarsh habitat in realigned areas. Effect on small area of freshwater habitat dependant on realignment extent. Compensatory habitat will need to be secured before any designated habitat is lost.	Continued protection to Lower Halstow Conservation Area. Potential loss of buried unknown heritage.	No loss of residential properties. Re-routing of pathway - Saxon Shore Way, where MR implemented.
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintan secondary defences.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will	Designated estuary landscape will be maintained, potential for visual enhancement with a more natural coastline as MR is established.	No net loss of internationally designated intertidal habitats and nationally important (BAP) habitat. However, due to coastal squeeze, loss will occur in some areas as will accretion elsewhere. Establishment of realigned saline habitat. Potential further effect on freshwater	Continued protection to Lower Halstow Conservation Area. Potential loss of buried unknown heritage.	No loss of residential properties. No loss of recreation features.

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Location reference:	***East of Upchurch to East Lower Halstow***
Policy Unit reference:	***E4 17***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Nature Conservation	Historic Environment	Population (Amenity & Recreational Use and Human Health)
		become intertidal.		habitat if defences realigned further.		
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintain secondary defences. locations.	Defences will continue to provide the appropriate standard of protection to built assets and infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained, potential for visual enhancement with a more natural coastline as MR is established.	Potential net effect on internationally designated intertidal habitats and nationally important (BAP) habitat with coastal squeeze, as sediment supply decreases in the estuary. Establishment of habitat in realigned areas. Potential further effect on freshwater habitat if defences realigned further.	Continued protection to Lower Halstow Conservation Area. Potential loss of buried unknown heritage.	No loss of residential properties. No loss of recreation features.

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Location reference:	**Barksore Marshes**
Policy Unit reference:	**E4 18**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Barksore Marshes is a peninsular of agricultural land and freshwater grazing marshes with no built assets. The marshes, apart from the northern tip, along with intertidal habitats skirting the shoreline, are nationally and internationally designated for their ecological value. The majority of the frontage is low-lying with the exception of an area of higher land located to the south where the peninsular connects with the mainland. The whole area is important for its landscape value.

In the short to medium term the plan is to realign defences to ensure that freshwater habitat landward of defences is appropriately managed before a no active intervention policy is implemented in the medium term. This will allow further study to take place regarding no active intervention along the frontage. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system. It is recognised that this section of shoreline provides an opportunity for environmental enhancement and habitat creation through a policy of managed realignment followed by no active intervention. As the flood plain rises to higher land naturally and there are no built assets on the floodplain, it is considered unsustainable and uneconomic to continue to protect the entire area of marshes in the long term.

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day:	If the socio-economic, environmental and technical benefits are confirmed by further studies, then it will be appropriate to implement **managed realignment** in the short term. New realigned secondary defences would be constructed where necessary, at a set-back position and the existing defences allowed to fail or deliberately removed in all or part. A number of factors make this appropriate:

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Location reference:	**Barksore Marshes**
Policy Unit reference:	**E4 18**

- the presence of raised topography behind the flood plain;
- the likely increasing cost of maintaining the existing alignment; and
- the need to appropriately manage the freshwater habitats whilst maintaining landscape value.

Shoreline footpaths will require re-routing in localised areas.

Loss of designated freshwater habitats will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme.

Intertidal areas are predicted to remain stable along the majority of frontage, as sediment supply is expected to meet demand within the estuary throughout this epoch. However, saltmarsh habitats at the tip of Barksore Marshes are expected to continue to erode on the seaward edge due to the confined nature of the channel at this location.

Medium-term:

In the medium term, if the socio-economic, environmental and technical benefits are confirmed by further studies, then it will be appropriate to implement a change of policy to **no active intervention** to allow natural processes, i.e. no maintenance of realigned defences. This will maintain the environmental and landscape value of intertidal habitats and result in a free functioning shoreline.

Evolution of intertidal areas will continue as per the previous epoch, remaining stable as sediment supply is expected to be able to meet demand throughout this epoch. However, erosion may become more prevalent along the seaward edge of the marshes and at the northern tip. This erosion will be driven by rising sea levels which will cause intertidal habitats to be squeezed against the realigned defences or higher ground.

Long-term:

The long-term policy is to continue to allow a free functioning shoreline under a policy of **no active intervention.** It is expected that created habitat in previously realigned areas will become well-established during this epoch.

Erosion of intertidal habitats may continue to become more prevalent in confined channel locations and around the edge of the marsh as sea levels rise and sediment supply to the estuary decreases.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Barksore Marshes***
Policy Unit reference:	***E4 18***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Nature Conservation	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Construct secondary defences.	Defences will continue to provide the appropriate standard of protection to infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated estuary landscape will be maintained. However, visually some features will change through realignment.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat. Creation of internationally and nationally important habitat in realigned area. Effect on internationally designated coastal grazing marsh and nationally important (BAP) habitat. Compensatory habitat will need to be secured before any designated habitat is lost. Potential for contamination of water resources	Potential loss of buried unknown heritage.	No loss of residential properties. Re-routing of pathways will be required.
20-50 years	Allow natural processes, i.e. inundation and erosion and natural erosion of defences.	Remaining secondary defences will continue to provide protection to infrastructure. Areas of land affected by managed realignment will become intertidal.	Designated landscape maintained. Visually more 'natural' shoreline.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat. Establishment of brackish / saline habitat in realigned area. Effect on internationally designated coastal grazing marsh and nationally important (BAP) habitat with further inundation.	Potential loss of buried unknown heritage.	No loss of residential properties. Re-routing of pathways will be required.

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Location reference:	***Barksore Marshes***
Policy Unit reference:	***E4 18***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Nature Conservation	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				Potential for contamination of water resources		
50-100 years	Allow natural processes, i.e. inundation and erosion.	Standard of protection of infrastructure will reduce throughout this epoch. Areas of land affected by managed realignment will become intertidal.	Designated landscape maintained. Visually more 'natural' shoreline.	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat with coastal squeeze as sediment supply declines. Establishment of brackish / saline habitat in realigned area. Affect on internationally designated coastal grazing marsh and nationally important (BAP) habitat with further inundation. Potential for contamination of water resources	Potential loss of buried unknown heritage.	No loss of residential properties. Re-routing of pathways will be required.

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Location reference:	**Funton to Raspberry Hill**
Policy Unit reference:	**E4 19**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The short length of frontage between Funton and Raspberry Hill comprises a small local road, running alongside the shoreline, backed by orchards. Intertidal habitats seaward of defences are nationally and internationally designated for their ecological importance.

The long term policy for this unit is to allow natural erosion of the frontage. As the flood plain is very narrow and there are very few built assets along this frontage, it is considered unsustainable and uneconomic to continue to protect the road in the long term.

Preferred policies to implement Plan:

From present day: The present day policy for Funton to Raspberry Hill is **no active intervention** to allow natural processes. This will maintain the ecological value of intertidal habitats and result in a free functioning shoreline.

The evolution of intertidal areas will be dependant on sediment supply. It is predicted that in this section of the estuary, Bedlams Bottom will continue to experience accretion and Funton Creek will remain stable, as sediment supply in the estuary is expected to meet demand throughout this epoch.

Medium-term: The medium term policy is to continue allowing natural processes under a policy of **no active intervention**. The road will become more exposed with sea level rise and increased storminess, and the road is likely to be flooded more often.

The evolution of intertidal areas will continue as per the previous epoch, remaining stable as sediment supply is expected to be able to meet demand throughout this epoch. However, erosion may become more prevalent along the seaward edge of the marshes as sea levels rise.

Long-term: The long term policy is **no active intervention**. This policy will allow the shoreline to continue to function and evolve freely, maintaining the ecological value of the fronting marshes. The road will be at increased risk of erosion during this period as sea levels rise, with the potential for eventual loss of the feature in the long term.

It is expected that intertidal areas may be subject to increased erosion as sea

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Location reference:	**Funton to Raspberry Hill**
Policy Unit reference:	**E4 19**
	levels rise and sediment supply in the Medway decreases over this epoch.

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Location reference:	***Funton to Raspberry Hill***
Policy Unit reference:	***E4 19***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Natural erosion of defences and higher land.	Damage to road with more frequent periods of inundation.	Designated estuary landscape will be maintained. However, some features will change through no active intervention.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat.	Potential loss of buried unknown heritage.	No loss of properties No loss of amenity and recreation features.
20-50 years	Natural erosion of higher land.	Damage to road with more frequent periods of inundation and increased erosion.	Designated landscape will be maintained.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat. However, potential for erosion on the seaward edge of saltmarsh as sea levels rise.	Potential loss of buried unknown heritage.	No loss of properties Damage to access to estuary viewing locations.
50-100 years	Natural erosion of higher land.	Loss of road due to erosion.	Designated landscape will be maintained.	Effect on saltmarsh with coastal squeeze as sea levels rise.	Potential loss of buried unknown heritage.	No loss of properties Loss of access to estuary viewing locations.

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Location reference:	**Chetney Marshes**
Policy Unit reference:	**E4 20**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Chetney Marshes is a large peninsular of low lying agricultural marsh that extends into the middle section of the Medway estuary and is bordered by the Swale along its eastern shoreline and the A249 road to the south. The marshes are considered to be one of the most important wildfowl breeding areas in Kent. An area of compensatory freshwater habitat has been created on part of the marshes as mitigation for loss of SPA habitat during improvements to the A249 and the Sheppey crossing. Survey data is showing that this area is meeting most of the requirements for the compensatory land and in the future, a discussion will need to be made as to whether it should be included in the SPA. Intertidal habitat surrounding the marshes and some areas of coastal grazing marsh are nationally and internationally designated for their ecological importance. The area is locally important for attracting bird watchers and walkers along the Saxon Shore Way which follows the southern shorelines, traversing the marshes approximately half way along the peninsular. The whole frontage is of important landscape value.

The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system in a controlled way, whilst continuing to provide flood defence to the remaining floodplain, freshwater habitats and infrastructure. It is recognised that this section of shoreline provides an opportunity for environmental enhancement and habitat creation through managed realignment and a more naturally functioning coastline balanced with the need to maintain the integrity of the internationally designated freshwater habitats..

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

This policy is considered to be sustainable in the long-term, on the basis that environmental, engineering and inter-tidal benefits will be realised and that the overall flood defence is maintained to limit flood propagation to low lying areas and infrastructure.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

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Location reference: **Chetney Marshes**

Policy Unit reference: **E4 20**

Preferred policies to implement Plan:

From present day: The present day policy is **managed realignment** The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will be implemented by constructing realigned secondary defences where necessary, at a set-back position and allow the existing defences to fail or deliberately removing all or part of the existing defences. This will require re-routing of shoreline footpaths in localised areas.

No specific realignment positions have been identified for the SMP. Large scale realignment is likely to result in significant increases in tidal prism, flow speeds and erosion in confined channel locations and may have implications on processes within the Swale. However, intertidal areas are predicted to remain more stable with smaller scale realignments as sediment supply is expected to meet demand throughout this epoch in both the Medway and Swale estuaries. The viability of managed realignment, the exact nature of shoreline response and the managed realignment works to be implemented will require further detailed studies.

A set back will involve the loss of some agricultural marsh as well as designated freshwater habitat, dependant on realignment extents. Loss of designated freshwater habitats will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme. As the coastline realigns, intertidal habitat will develop in the realigned areas.

Intertidal areas are predicted to remain stable along the majority of frontage, as sediment supply is expected to meet demand within the estuaries throughout this epoch. Saltmarsh habitats around Deadmans Island are, however, expected to continue to erode on the seaward edge due to the confined nature of the channel at this location.

Medium-term: The medium term policy is to continue allowing the shoreline to evolve naturally under a policy of **managed realignment**. Defences will require further maintenance throughout this period as sea levels rise. Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

Evolution of intertidal areas will continue as per the previous epoch, remaining

Location reference:	**Chetney Marshes**
Policy Unit reference:	**E4 20**

stable as sediment supply is expected to be able to meet demand throughout this epoch. However erosion may become more prevalent along the seaward edge of the marshes and at Deadmans Island as sea levels rise.

Long-term:

The long-term policy is a continuation of **managed realignment**, to enable more flexible and sustainable flood and erosion risk management within the estuary. All defences will require periodic maintenance and potential upgrading with sea level rise. It is expected that created habitat will become well-established during this epoch and afford additional protection to low lying hinterland areas.

Erosion of intertidal habitats will continue to become more prevalent in confined channel locations and around the edge of the marshes as sea levels rise and sediment supply to the Medway estuary decreases.

Location reference:	***Chetney Marshes***
Policy Unit reference:	***E4 20***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will provide an appropriate level of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal. MR along the Swale frontage may impact on future commercial traffic in the Swale estuary.	Designated estuary landscape will be maintained. However, some features will change through realignment.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat. Creation of internationally and nationally important habitat in realigned area. Effect on internationally designated coastal grazing marsh and nationally important (BAP) habitat. Compensatory habitat will need to be secured before any designated habitat is lost. There may be hydromorphological and physical changes to the Iwade at the tidal interface but this will improve rather than deteriorate the ecological potential associated with WFD objective 2, “no changes that will cause failure to meet surface water “good” ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological	Potential loss of buried unknown heritage.	Defences will provide an appropriate level of protection to property Re-routing of footpaths where MR is implemented.

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Location reference:	***Chetney Marshes***
Policy Unit reference:	***E4 20***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				status/potentials".		
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintan secondary defences.	Defences will provide an appropriate level of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal. MR along the Swale frontage may impact on current and future commercial traffic in the Swale estuary.	Designated landscape maintained. Visually more 'natural' shoreline.	No net loss of internationally designated intertidal habitat and nationally important (BAP) habitat. Establishment of habitat in realigned area. Effect on internationally designated coastal grazing marsh and nationally important (BAP) habitat if defences realigned further. There may be hydromorphological and physical changes to the Iwade at the tidal interface but this will improve rather than deteriorate the ecological potential associated with WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".	Potential loss of buried unknown heritage.	Defences will provide an appropriate level of protection to property No loss of amenity or recreation features.

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Location reference:	***Chetney Marshes***
Policy Unit reference:	***E4 20***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintain secondary defences. locations.	Defences will provide an appropriate level of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal. MR along the Swale frontage may impact on future commercial traffic in the Swale estuary.	Designated landscape maintained. Visually more 'natural' shoreline.	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat with coastal squeeze as sediment supply declines. Establishment of habitat in realigned area. Effect on internationally designated coastal grazing marsh and nationally important (BAP) habitat if defences realigned further. There may be hydromorphological and physical changes to the Iwade at the tidal interface but this will improve rather than deteriorate the ecological potential associated with WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".	Potential loss of buried unknown heritage.	Defences will provide an appropriate level of protection to property No loss of amenity or recreation features.

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Location reference:	**Kingsferry Bridge to Milton Creek**
Policy Unit reference:	**E4 21**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The Kingsferry Bridge and rail link to the Isle of Sheppey border the frontage to the north. Regionally important industrial, commercial and dock developments and associated infrastructure are located along the remaining low lying frontage. Substantial developments have been proposed at Ridham Dock and Kemsley Fields. Coastal grazing marsh on the flood plain and fronting intertidal mudflat and saltmarsh areas are of national and international ecological importance. The Saxon Shore Way follows the shoreline along the majority of this frontage.

The long term plan is to minimise flood risk and protect developments, as well as the backing hinterland and its ecological assets. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is therefore deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for Kingsferry Bridge to Milton Creek is to continue to **hold the line** and protect the built and environmental assets and backing hinterland. This will be achieved by continuing to maintain the existing defences, which are composed of rock revetments.

Intertidal areas are likely to accrete or remain stable in this area, therefore there is expected to be very little change in estuary processes or impacts on evolution occurring within this epoch.

Medium-term: The medium term policy is to continue to **hold the line**. This will be achieved by maintaining and, at some point during this epoch, upgrading the defence structures to protect the built and freshwater environmental assets from sea level rise.

In locations where the estuary is particularly wide (e.g. towards the mouth of Milton Creek), continued vertical saltmarsh accretion is expected as sediment supply is assumed to meet demand within the estuary over this epoch. Sea level rise may however, result in coastal squeeze and consequently increased potential for intertidal erosion in constrained channel locations.

Long-term: The significant built assets along this frontage dictate that the long-term policy

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Location reference:	**Kingsferry Bridge to Milton Creek**
Policy Unit reference:	**E4 21**

is to **hold the line**. To accomplish this and to keep pace with sea level rise defences will need to be maintained and upgraded.

Accretion should continue in wide channel areas. However, the potential for intertidal erosion will be exacerbated with sea level rise in confined sections.

Location reference:	***Kingsferry Bridge to Milton Creek***
Policy Unit reference:	***E4 21***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of internationally designated coastal grazing marsh or intertidal areas (BAP habitats). Potential coastal squeeze/ accelerated erosion in the Swale Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".	Potential loss of unknown heritage buried in intertidal zone.	No loss of recreational facilities. Footpaths – Saxon Shore Way will remain.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	Potential effect on internationally designated intertidal habitat and nationally important (BAP) habitat due to coastal squeeze in confined channel locations. Continued accretion elsewhere. No loss of internationally designated coastal grazing marsh and nationally important (BAP) habitat. Potential coastal squeeze/	Potential loss of unknown heritage buried in intertidal zone.	No loss of recreational facilities. Footpaths – Saxon Shore Way will remain.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Kingsferry Bridge to Milton Creek***
Policy Unit reference:	***E4 21***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				accelerated erosion in the Swale Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".		
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat due to coastal squeeze in confined channel locations, continued accretion elsewhere. No loss of internationally designated coastal grazing marsh and nationally important (BAP) habitat. Potential coastal squeeze/ accelerated erosion in the Swale Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface	Potential loss of unknown heritage buried in intertidal zone.	No loss of recreational facilities. Footpaths – Saxon Shore Way will remain.

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Location reference:	***Kingsferry Bridge to Milton Creek***
Policy Unit reference:	***E4 21***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".		

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Location reference:	**Milton Creek**
Policy Unit reference:	**E4 22**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Milton Creek extends from the Swale, south towards Sittingbourne. The eastern bank comprises a number of regionally important commercial and industrial built assets, located close to the creek shoreline. The Saxon Shore Way traverses the western bank and part of the eastern bank of the Creek. The Sittingbourne and Kemsley Light Railway is set back from the western bank and extends from Sittingbourne in the south to Kemsley in the north. Large residential and commercial areas are located on the creek's floodplain. Milton Creek is a local SNCI and the north eastern bank of the creek is internationally designated.

The long term plan is to continue protecting the developments including the residential, commercial and industrial assets. This recommendation is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

At present, groundwater levels are affected by extraction at Milton Creek. Changes in future groundwater extraction may therefore affect groundwater levels and surface flooding. Further studies will therefore be required to consider the impact of such changes on the policy of hold the line.

Preferred policies to implement Plan:

From present day: The present day policy for Milton Creek is to continue to **hold the line** by maintaining and improving the existing defences to protect the significant assets contained within the town of Sittingbourne and along the creek itself, including assets that are important to the regional economy. This will be achieved by continuing to maintain the existing defences, which comprise rock revetments and embankments.

Intertidal areas are likely to be stable or accrete in this area, therefore there is expected to be very little change in estuary processes or impacts on evolution occurring within this epoch.

Medium-term: The medium term policy is to continue to **hold the line**. This will be achieved by maintaining and, at some point during this epoch, upgrading the defence structures. This will protect the significant built assets from sea level rise.

Intertidal areas are predicted to remain stable as sediment supply within the Swale estuary is expected to meet demand throughout this epoch.

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Location reference:	**Milton Creek**
Policy Unit reference:	**E4 22**
Long-term:	The significant built assets along this frontage dictate that the long-term policy is to **hold the line**. To accomplish this and to keep pace with sea level rise defences will need to be maintained and upgraded. Despite ongoing sea level rise, erosion rates along this frontage are expected to remain low, thus the general character of this frontage will not alter significantly.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Milton Creek***
Policy Unit reference:	***E4 22***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of internationally designated saline lagoon (BAP habitats). There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage.	Potential loss of unknown heritage buried in intertidal zone.	No loss of residential or commercial properties or community facilities. Footpaths – Saxon Shore Way will remain.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	No loss of internationally designated saline lagoon (BAP habitats). There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage.	Potential loss of unknown heritage buried in intertidal zone.	No loss of residential or commercial properties or community facilities. Footpaths – Saxon Shore Way will remain.
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape	No loss of internationally designated saline lagoon (BAP habitats). There is potential for impacts of groundwater extraction on groundwater levels in this policy	Potential loss of unknown heritage buried in intertidal zone.	No loss of residential or commercial properties or community facilities. Footpaths – Saxon Shore Way will remain.

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			character.	unit – uncertainty regarding impacts at this stage.		

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Location reference:	**Murston Pits to Faversham**
Policy Unit reference:	**E4 23**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The Murston Pits to Faversham frontage extends along the southern shore of the Swale, and incorporates Conyer and Oare Creeks and the north west section of Faversham Creek. The frontage comprises a large expanse of floodplain which rises to high land in the south. A small number of properties are located on higher land, around the edge of the floodplain and in the communities of Conyer and Oare. The low-lying hinterland consists mainly of agricultural land and coastal grazing marsh, which like the intertidal mudflat and saltmarsh along the frontage, are nationally and internationally designated. The area is locally important for attracting visitors to the Saxon Shore Way which extends along the perimeter of the frontage, and to a number of nature reserves and bird watching sites located along the frontage. Conyer and Oare Creeks and the Gun Powder Works at Oare are of significant heritage importance whilst the whole frontage is of important landscape value.

In the short term the recommended plan is to protect the environmental assets and the low-lying floodplain, which includes properties, roads, agricultural land, freshwater habitats. The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the large floodplain and the residential communities of Conyer and Oare. It is recognised that this section of shoreline provides an opportunity for environmental enhancements and habitat creation through a localised managed realignment policy and a more naturally functioning coastline.

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat. Further studies also will be required to investigate associated affects on processes within the creeks.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. This policy is considered to be sustainable in the long-term, on the basis that overall flood defence is maintained to protect the remaining floodplain and settlements.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Murston Pits to Faversham**
Policy Unit reference:	**E4 23**

From present day: The present day policy for Murston Pits to Faversham is to continue to **hold the line** by maintaining existing defences to provide protection to the large floodplain, properties, agricultural land and freshwater habitats. During this epoch, further detailed study would be required to ensure the viability and nature of shoreline response of a localised managed realignment policy along this frontage.

Medium-term: The medium term policy changes to **managed realignment with localised hold the line**. There is a need to control the realignment of this shoreline to best manage estuarine geomorphology and the integrity of European wildlife sites. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will involve maintaining and upgrading existing defences at Oare and Conyer, whilst constructing new realigned secondary defences at a set-back position elsewhere. Footpaths will need to be rerouted where defences are realigned.

No specific realignment position has been identified for the SMP. Large scale realignment is likely to result in significant increases in tidal prism, flow speeds and erosion in confined channel locations. However, intertidal areas are predicted to remain more stable with smaller scale realignment as sediment supply is expected to meet demand throughout this epoch in the Swale estuary. The exact nature of shoreline response and the managed realignment works to be implemented will require further detailed studies.

The shoreline will remain fixed in position to the east (Milton Creek) and west (Faversham Creek) in accordance with the policies for those adjacent Policy Units. As the shoreline realigns, intertidal habitat will develop in realigned areas. Loss of designated freshwater habitats will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme.

Long-term: The long-term policy is to continue allowing the shoreline to realign in sections, under a policy of **managed realignment with localised hold the line**, to enable more flexible and sustainable flood and erosion risk management within the estuary. All defences will require periodic maintenance whilst existing defences around Oare and Conyer may require upgrading with sea level rise.

It is expected that created habitat in realigned areas will become well-established during this epoch and provide added protection to the hinterland.

Location reference:	**Murston Pits to Faversham**
Policy Unit reference:	**E4 23**

However, coastal squeeze and erosion may become more prevalent in confined channel locations and exposed areas with sea level rise and increased storminess. A policy of managed realignment at Shell Ness to Sayes Court on the Isle of Sheppey may mean that the eastern section of this frontage will become more exposed to open coast conditions throughout this epoch.

Location reference:	***Murston Pits to Faversham Creek***
Policy Unit reference:	***E4 23***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of designated habitats. Compensatory habitat will need to be secured before any designated habitat is lost in epoch 2. There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage.	Potential loss of buried unknown heritage.	No loss of recreation features or residential properties.
20-50 years	Undertake engineering works to defences to Hold the Line of sections of defences that protect key assets and construct secondary defences in suitable locations.	Defences will provide the appropriate standard of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal.	Designated landscape maintained. However, some features will change through realignment.	Effect on internationally designated freshwater habitat and nationally important (BAP) habitat dependant on MR extent. Transition of habitats from freshwater to internationally and nationally important intertidal habitat in	Potential loss of buried unknown heritage.	No loss of recreation features or residential properties. Re-routing of footpaths – Saxon Shore Way where MR is implemented.

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Location reference:	***Murston Pits to Faversham Creek***
Policy Unit reference:	***E4 23***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				realigned areas. There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage.		
50-100 years	Undertake engineering works to defences to Hold the Line of sections of defences protecting key assets. Maintain secondary defences.	Defences will provide the appropriate standard of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal.	Designated landscape maintained. Potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage.	Potential loss of buried unknown heritage.	No loss of recreation features or residential properties.

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Location reference:	**Faversham to Nagden**
Policy Unit reference:	**E4 24**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Faversham to Nagden marks the eastern landward limit of the Medway Estuary and Swale Shoreline Management Plan, and the interface between the Swale estuary and the open coast (Policy Unit 4a 07A: Faversham Creek to Sportsman Pub – Isle of Grain to South Foreland, SMP2. The preferred policies for this adjacent open coast frontage are Hold the Line in the short term, followed by Managed Realignment in the medium and long terms). The frontage incorporates the south of Faversham Creek and a short section of the eastern bank. A large number of industrial, commercial, residential and heritage assets are located along the southern sections of Faversham Creek, including the historic town of Faversham. The area is locally important for attracting visitors to the nationally important Conservation Area and Saxon Shore Way which extends along the banks of Faversham Creek. Intertidal habitats and a narrow section of creek bank are internationally designated for their ecological importance. The hinterland between Faversham and Nagden comprises agricultural land and a small area of industrial works adjacent to the creek.

The long term plan is to continue protecting the developments, including the residential, historic, commercial and industrial assets and agricultural land. This recommendation is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for Faversham to Nagden is to continue to **hold the line** by maintaining the existing defence to protect the significant assets contained within the historic town of Faversham and along the creek itself. This will be achieved by continuing to maintain the existing defences, which comprise rock revetments and embankments.

Intertidal areas are likely to be stable or accrete in this area, therefore there is expected to be very little change in estuary processes or impacts on evolution occurring within this epoch.

Medium-term: The medium term policy is to continue to **hold the line**. This will be achieved by maintaining and, at some point during this epoch, upgrading the defence structures. This will protect the significant built assets from sea level rise.

Intertidal areas are predicted to remain stable as sediment supply within the Swale estuary is expected to meet demand throughout this epoch.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Faversham to Nagden**
Policy Unit reference:	**E4 24**
Long-term:	The significant built assets along this frontage dictate that the long-term policy is to **hold the line**. To accomplish this and to keep pace with sea level rise defences will need to be maintained and upgraded. Despite ongoing sea level rise, erosion rates along this frontage are expected to remain low, athough the potential for coastal squeeze may increase. The general character of this frontage is not expected to alter significantly.

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Location reference:	***Faversham to Nagden***
Policy Unit reference:	***E4 24***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of internationally designated coastal grazing marsh or intertidal habitats (BAP habitats).	Potential loss of unknown heritage buried in intertidal zone.	No loss of residential or commercial properties or recreational facilities. Footpaths – Saxon Shore Way will remain.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	No loss of internationally designated coastal grazing marsh or intertidal habitats (BAP habitats).	Potential loss of unknown heritage buried in intertidal zone.	No loss of residential or commercial properties or recreational facilities. Footpaths – Saxon Shore Way will remain.
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained but with increased defences. Larger defences may affect landscape character.	No loss of internationally designated coastal grazing marsh or intertidal habitats (BAP habitats), however potential for coastal squeeze leading to a loss of intertidal habitat as sea levels rise.	Potential loss of unknown heritage buried in intertidal zone.	No loss of residential or commercial properties or recreational facilities. Footpaths – Saxon Shore Way will remain.

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Location reference:	**Shell Ness to Sayes Court**
Policy Unit reference:	**E4 25**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The frontage comprises a sand and shell beach (managed toward the open coast) and spit, which is backed by nationally and internationally designated saltmarsh and low-lying coastal grazing marsh. Under rising sea levels it is anticipated that it will become increasingly difficult to maintain the beach along this frontage. Coastal squeeze together with a diminished supply of natural beach building sediment would lead to increased erosion if the current alignment were to be held in the long-term. Managed realignment would reduce the need for new defence works or beach management measures, possibly creating cost savings and environmental enhancements.

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The management of this frontage is consistent with the open coast policy unit (Policy Unit 4a 06: Leysdown-on-Sea to Shell Ness – Isle of Grain to South Foreland, SMP2. The preferred policy for this adjacent open coast frontage is Managed Realignment for all three epochs), which also proposes managed realignment for all three epochs.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. This policy is considered to be sustainable in the long-term, on the basis that environmental, engineering and inter-tidal benefits will be realised and that the overall flood defence is maintained to limit flood propagation.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day: The present day policy is **managed realignment** for Shell Ness to Sayes Court**.** There is a need to control the realignment of this shoreline to best manage estuarine geomorphology and the integrity of European wildlife sites. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. To eliminate/reduce the risk of large scale flooding, new defence structures will need to be constructed, at a set-back position, prior to allowing the existing shoreline defence structures to fail or deliberately removing all or part of the existing defences. This will require re-routing of shoreline footpaths

Location reference:	**Shell Ness to Sayes Court**
Policy Unit reference:	**E4 25**

in localised areas.

No specific realignment positions have been identified for the SMP. Any set back however, will involve the loss of some agricultural land as well as designated freshwater habitat. The extent of these losses will be dependant on realignment extents. Loss of designated freshwater habitats would require mitigation / compensation measures to be implemented, and this aspect will require more detailed appraisal.

Medium-term:

The medium-term policy is to continue to allow the shoreline to respond to changes in the forcing factors under a policy of **managed realignment.** The realigned defences will require further maintenance throughout this period. It is envisaged that environmental transitions will be prominent during this epoch, as brackish and inter-tidal habitats replace some of the freshwater interests. This transition may require specific management intervention to maximise the environment benefits and limit potential habitat impacts.

During this epoch there is the potential that the integrity of Shell Ness spit could reduce, due to a potential reduction in feed (from offshore) and the predicted rise in sea level. It is also anticipated that the connections between the estuary and open coast will increase during this epoch.

Long-term:

The long-term policy is to continue allowing the shoreline to respond naturally, under a policy of **managed realignment**, by maintaining realigned defences. This will enable more flexible and sustainable flood and erosion risk management for this section of the Swale estuary (as well as the open coast – Leysdown-on-Sea to Shell Ness). It is expected that created habitat in realigned areas will become well-established during this epoch and provide added protection to the low lying hinterland.

With sea level rise predicted to accelerate during this epoch it is envisaged that the dynamics between the open coast and the Swale Estuary will undergo change. During this epoch it is likely that the integrity of Shell Ness spit will continue to reduce (due to sea level rise and uncertainty regarding feed). As such, it is envisaged that the northern shore of the Swale will realign landwards and the mouth will widen. This would result in the southern shore of the Swale and open coast at Faversham becoming increasingly exposed to open coast conditions.

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Location reference:	***Shell Ness to Sayes Court***
Policy Unit reference:	***E4 25***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Construct secondary defences.	Areas of land affected by managed realignment will become intertidal.	Estuary landscape will be maintained. However some features will change through realignment.	Effect on internationally designated freshwater habitat and nationally important (BAP) habitat. Compensatory habitat will need to be secured before any designated habitat is lost. Transition of habitats from freshwater to internationally and nationally important brackish and saline habitat in realigned areas. Effect on sections of National Nature Reserve.	No loss of Sayes Court SM. Potential loss of buried unknown heritage.	Property at Shell Ness no longer protected (as MR policy between Leysdown-on-Sea and Shell Ness (Isle of Grain to South Foreland SMP2). Re-routing of footpaths where MR is implemented.
20-50 years	Undertake engineering works to maintain the realigned defence line.	Areas of land affected by managed realignment will become intertidal.	Estuary landscape maintained. Potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. Effect on sections of National Nature Reserve.	No loss of Sayes Court SM. Potential loss of buried unknown heritage.	Property at Shell Ness no longer protected (as MR policy between Leysdown-on-Sea and Shell Ness (Isle of Grain to South Foreland

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Shell Ness to Sayes Court***
Policy Unit reference:	***E4 25***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
						SMP2).
50-100 years	Undertake engineering works to maintain the realigned defence line.	Areas of land affected by managed realignment will become intertidal.	Estuary landscape maintained. Potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. Effect on sections of National Nature Reserve.	No loss of Sayes Court SM. Potential loss of buried unknown heritage.	Property at Shell Ness no longer protected (as MR policy between Leysdown-on-Sea and Shell Ness (Isle of Grain to South Foreland SMP2).

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Sayes Court to North Elmley Island**
Policy Unit reference:	**E4 26**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

The Sayes Court to North Elmley Island frontage extends along the south of the Isle of Sheppey and forms part of the northern bank of the Swale. The frontage comprises a large expanse of floodplain which rises to high land in the north. A small number of properties and farms are located on the floodplain and on higher land. The low-lying hinterland is interspersed with secondary embankments, a legacy of past land reclamation. These areas consist mainly of agricultural land and coastal grazing marshes, which like the intertidal mudflat and saltmarsh along the frontage, are internationally designated. The area is locally important for attracting visitors to the National Nature Reserve and the RSPB Reserve located along the western edge of the frontage. Sayes Court SM, located on higher land on the Isle of Harty, is of significant heritage importance whilst the whole frontage is of important landscape value.

The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the large floodplain and isolated properties. It is recognised that this section of shoreline provides an opportunity for environmental enhancement and habitat creation through a managed realignment policy.

No specific realignment positions have been identified for the SMP.. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. This policy is considered to be sustainable in the long-term, on the basis that environmental, engineering and inter-tidal benefits will be realised and that the overall flood defence is maintained to limit flood propagation.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day: The present day policy is **managed realignment**f or Sayes Court to Elmley Island**.** There is a need to control the realignment of the shoreline to best manage estuarine geomorphology and the integrity of European wildlife sites. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. This will be implemented by constructing realigned secondary

Location reference:	**Sayes Court to North Elmley Island**
Policy Unit reference:	**E4 26**

defences at a set-back position and deliberately removing all or part of the existing defences or allowing them to fail. This will require re-routing of shoreline footpaths in localised areas.

No specific realignment positions have been identified for the SMP. Large scale realignment is likely to result in significant increases in flow speeds and erosion in confined channel locations. However, intertidal areas are predicted to remain more stable with smaller scale realignment as sediment supply is expected to meet demand throughout this epoch in the Swale estuary. The viability of managed realignment, the exact nature of shoreline response and the managed realignment works to be implemented will need to be investigated in further more detailed studies.

A set back will involve the loss of some agricultural land as well as designated freshwater habitat. The extent of these losses will be dependant on realignment extents. Loss of designated freshwater habitats will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme. The coastline will remain naturally fixed in position to the east (high land at the Isle of Harty) and to the west (high land at Elmley Island). As the coastline realigns, intertidal habitat will develop in the realigned areas.

Medium-term:

The medium term policy is to continue allowing the shoreline to realign, albeit in a controlled manner, under a policy of **managed realignment**. Defences will require further maintenance throughout this period as sea levels rise. Environmental transitions will be prominent during this epoch as brackish and intertidal habitats replace some of the freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts.

Intertidal areas are expected to remain stable even with sea level rise, as realigned areas will allow for the translation of intertidal habitats landward and a continued sediment supply within the Swale will enable vertical accretion of these habitats.

Long-term:

The long-term policy is a continuation of **managed realignment**, to enable more flexible and sustainable flood and erosion risk management within the estuary. All defences will require periodic maintenance and potential upgrading with sea level rise. It is expected that created habitat will become well-established during this epoch and afford additional protection to low lying

Location reference:	**Sayes Court to North Elmley Island**
Policy Unit reference:	**E4 26**

hinterland areas.

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Location reference:	***Sayes Court to North Elmley Island***
Policy Unit reference:	***E4 26***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Construct secondary defences.	Secondary defences will provide an appropriate level of protection to built assets and some areas of agricultural land. Areas of land affected by managed realignment will become intertidal.	Estuary landscape will be maintained, however some features will change through realignment.	Effect on internationally designated freshwater habitat and nationally important (BAP) habitat. Compensatory habitat will need to be secured before any designated habitat is lost. Transition of habitat from freshwater to internationally and nationally important brackish and saline habitat in realigned areas. There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage. Effect on sections of National Nature Reserve	No loss of Sayes Court SM. Potential loss of buried unknown heritage.	No loss of residential properties. Re-routing of footpaths where MR is implemented.

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Location reference:	***Sayes Court to North Elmley Island***
Policy Unit reference:	***E4 26***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				and RSPB Reserve.		
20-50 years	Undertake engineering works to maintain the realigned defence line.	Secondary defences will provide an appropriate level of protection to built assets and some areas of agricultural land. Areas of land affected by managed realignment will become intertidal.	Estuary landscape maintained, potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage. Effect on sections of National Nature Reserve and RSPB Reserve.	No loss of Sayes Court SM. Potential loss of buried unknown heritage.	No loss of residential properties.
50-100 years	Undertake engineering works to maintain the realigned defence line.	Secondary defences will provide an appropriate level of protection to built assets and some areas of agricultural land. Areas of land affected by managed realignment will become intertidal.	Estuary landscape maintained, potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage.	No loss of Sayes Court SM. Potential loss of buried unknown heritage.	No loss of residential properties.

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Location reference:	***Sayes Court to North Elmley Island***
Policy Unit reference:	***E4 26***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
				Effect on sections of National Nature Reserve and RSPB Reserve.		

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**North Elmley Island to Kingsferry Bridge**
Policy Unit reference:	**E4 27**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

North Elmley Island to Kingsferry Bridge constitutes part of the northern bank of the Swale, and extends along the south-west of the Isle of Sheppey from the high land of Elmley Hills to the south to the main A249 road and railway link to the Isle of Sheppey in the north. The low-lying hinterland consists mainly of agricultural land and coastal grazing marsh, which like the intertidal mudflat and saltmarsh along the frontage, are internationally designated. A small number of properties at Minster Marshes and two local roads are set back from the shoreline. The southern section of hinterland forms part of the Swale National Nature Reserve and the Elmley National Nature Reserve.

In the short term the recommended plan is to protect the ecological assets and the low-lying floodplain, which includes properties, roads, agricultural land and freshwater habitats. The recommended long-term plan is to allow the coastline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the large floodplain and isolated properties. It is recognised that this section of shoreline provides an opportunity for environmental enhancement and habitat creation through a managed realignment policy.

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. The policies are considered to be sustainable in the long-term, on the basis that overall flood defence is maintained to limit flood propagation.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day: The present day policy for North Elmley Island to Kingsferry Bridge is to continue to **hold the line** by maintaining existing defences to provide protection to the large floodplain, infrastructure, properties, agricultural land and freshwater habitats.

Intertidal areas are likely to accrete or remain stable in this area. Therefore there is expected to be very little change in estuary processes or impacts on

Location reference:	**North Elmley Island to Kingsferry Bridge**
Policy Unit reference:	**E4 27**

evolution within this epoch.

This policy would allow for further study to take place regarding realignment in the next epoch and possible implications regarding essential infrastructure (i.e. railway line and A249).

Medium-term:

The medium term policy changes to **managed realignment with localised hold the line**. There is a need to control the realignment of this shoreline to best manage estuarine geomorphology and the integrity of European wildlife sites. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will involve constructing realigned secondary defences at a set-back position and deliberately removing all or part of the existing defences or allowing them to fail. This will require re-routing of shoreline footpaths in localised areas.

No specific realignment position has been identified for the SMP. Loss of designated freshwater habitats will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme. The coastline will remain fixed in position to the south (high land at Elmley Hills) and to the north (infrastructure). As the coastline realigns, brackish and intertidal habitats will develop in realigned areas, replacing freshwater interests. This may require specific management to maximise the environmental benefits and limit potential habitat impacts. Stability and accretion of intertidal habitats is expected to continue as sediment supply is assumed to meet demand within the Swale estuary over this epoch.

Long-term:

The long-term policy is to continue allowing the shoreline to realign, whilst continuing to provide protection to infrastructure and low lying areas under a policy of **managed realignment**, to enable more flexible and sustainable flood and erosion risk management within the estuary. All defences will require periodic maintenance and potential upgrading with sea level rise.

It is expected that created habitat in realigned areas will become well-established during this epoch and provide added protection to the low-lying hinterland, as sea levels rise. Erosion of saltmarsh edges may become more prevalent as tidal prisms and water flows increase with sea level rise.

Location reference:	***North Elmley Island to Kingsferry Bridge***
Policy Unit reference:	***E4 27***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of designated habitats. Compensatory habitat will need to be secured before any designated habitat is lost in epoch 2. There is potential for impacts of groundwater extraction on groundwater levels in this policy unit – uncertainty regarding impacts at this stage.	Potential loss of buried unknown heritage.	No loss of recreation features or residential properties.
20-50 years	Undertake engineering works to hold the defence line and construct secondary realigned defences.	Defences will provide the appropriate standard of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the	Estuary landscape will be maintained, however some features will change through realignment.	Effect on internationally designated freshwater habitat and nationally important (BAP) habitat. Creation of internationally and nationally important habitat in realigned areas. Effect on sections of National Nature Reserve dependant on realignment	Potential loss of buried unknown heritage.	Re-routing of footpaths – where MR is implemented.

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		Swale estuary.		position.		
50-100 years	Undertake engineering works to maintain the realigned defence line.	Defences will provide the appropriate standard of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the Swale estuary.	Estuary landscape maintained, potential for a more 'natural' shoreline.	Establishment of brackish and saline habitats in realigned areas. Potential for affect on edges of internationally designated saltmarsh and nationally important (BAP) habitat in confined areas. Effect on sections of National Nature Reserve dependant on realignment position.	Potential loss of buried unknown heritage.	Re-routing of footpaths – where MR is implemented.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Kingsferry Bridge to Rushenden**
Policy Unit reference:	**E4 28**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

A low lying area immediately north of Kingsferry Bridge which leads to Rushenden Dredging Disposal Site, an area of higher land along the north of the frontage. Sections of the low lying hinterland and intertidal habitats close to the shoreline along the whole of the frontage are internationally designated for their ecological importance.

In the short to medium term the plan is to continue protecting the low lying assets, which include properties, infrastructure, agricultural land and freshwater habitats. This will allow further studies to take place regarding managed realignment along the frontage and potential contamination of the disposal site. The recommended long-term plan is to allow the shoreline to realign to a more naturally functioning system, whilst continuing to provide flood defence to the low-lying floodplain, infrastructure and built assets. It is recognised that this section of shoreline provides an opportunity for environmental enhancement and habitat creation through managed realignment.

No specific realignment positions have been identified for the SMP. The potential impact on internationally designated sites will be a limiting factor on realignment extents and therefore, further studies will be required to investigate and define the extent, location and implementation of the realignment i.e. the best technical, environmental and economic option that best manages flood risk. These studies will also need to investigate the exact standard and alignment of any defences for this frontage and any mitigation measures required for loss of designated habitat.

The aim of these policies is to work towards achieving a more naturally functioning estuary and the creation of important brackish and saline habitats whilst at the same time creating a shoreline with a reduced requirement for defence maintenance. The policies are considered to be sustainable in the long-term, on the basis that overall flood defence is maintained to limit flood propagation.

The effect of these policies on designated conservation sites has been assessed in partnership with Natural England.

Preferred policies to implement Plan:

From present day:	The present day policy for Kingsferry Bridge to Rushenden is **hold the line** by maintaining existing defences to provide protection to the floodplain, properties, infrastructure, agricultural land and freshwater habitats. Maintaining the existing defence line in short term will allow further studies to be conducted at strategy level, regarding the viability of managed realignment with regards to implications regarding essential infrastructure (railway, road, sewage) and potential contamination of land at the disposal site.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	**Kingsferry Bridge to Rushenden**
Policy Unit reference:	**E4 28**

Due to the confined nature of the channel in this location, erosion of intertidal areas will continue and as such will naturally dredge the channel.

Medium-term:

The medium term policy changes to **managed realignment**. There is a need to control the realignment of this shoreline to best manage estuarine geomorphology and the integrity of European wildlife sites. The detailed alignment, will be subject to further study to address uncertainties and confirm the best technical, environmental and economic option to manage the estuary. The policy will will be implemented by constructing new structures at a set-back position to continue to provide protection to assets and infrastructure, and deliberately removing all or part of the existing defences or allowing them to fail. This will require re-routing of shoreline footpaths in localised areas.

No specific realignment position has been identified for the SMP. The viability of this policy, exact nature of shoreline response and the managed realignment works to be implemented will be the subject of further studies.

Loss of designated freshwater habitats will need to be managed in line with the Habitats Regulations Assessment (Appendix J) and the Regional Habitat Creation Programme.

With climate change, sea levels will rise and flows will increase, resulting in an enhanced potential for erosion in confined areas, e.g. potential erosion of the high land at the disposal site. The enlarged intertidal area, created as habitats translate landwards in sections where defences are set-back, will however afford added protection to the hinterland.

Long-term:

The long-term policy is to continue allowing the shoreline to realign, under a policy of **managed realignment**, to enable more flexible and sustainable flood and erosion risk management within the estuary. Defences will require further maintenance throughout this period as sea levels rise. However, the realigned intertidal area will continue to afford added protection to the hinterland. It is expected that created habitat will become well-established during this epoch.

Location reference:	***Kingsferry Bridge to Rushenden***
Policy Unit reference:	***E4 28***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	No loss of designated habitats. Compensatory habitat will need to be secured before any designated habitat is lost in epoch 2.	Potential loss of buried unknown heritage.	No loss of recreation features, residential properties or commercial facilities.
20-50 years	Construct secondary defences. Managed realignment of disposal site.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the Swale estuary.	Estuary landscape will be maintained, however some features will change through realignment.	Some effect on internationally designated freshwater habitat and nationally important (BAP) habitat. Creation of internationally and nationally important habitat in realigned areas. Potential effect on internationally designated intertidal habitat and nationally important (BAP) habitat with coastal squeeze in confined channel locations, as sea levels rise. Potential for contamination issues associated with managed realignment at Rushenden disposal site.	Potential loss of buried unknown heritage.	Re-routing of footpaths – where MR is implemented.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Kingsferry Bridge to Rushenden***
Policy Unit reference:	***E4 28***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
50-100 years	Undertake engineering works to maintain the realigned defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and some agricultural land. Areas of land affected by managed realignment will become intertidal. MR may impact on future commercial traffic in the Swale estuary.	Estuary landscape will be maintained, however some features will change through realignment.	Establishment of brackish and saline habitats in realigned areas. Potential for effect on edges of internationally designated saltmarsh and nationally important (BAP) habitat in confined areas.	Potential loss of buried unknown heritage.	No loss of recreation features.

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Location reference:	**Rushenden to Sheerness**
Policy Unit reference:	**E4 29**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

Rushenden to Sheerness marks the western extremity of the Isle of Sheppey and the interface between the Medway estuary and the open coast (Policy Unit 4a 02: Garrison Point to Minster – Isle of Grain to South Foreland, SMP2. The preferred policy for the adjacent open coast frontage is Hold the Line in all three epochs). This section of the shoreline comprises the urban areas of Rushenden and Queenborough, which is of national heritage importance, the internationally important port of Sheerness and regionally important strategic links. Intertidal habitats between Rushenden and north of Queenborough are internationally designated.

The long term plan is to continue protecting the developments including the residential, commercial and industrial assets. Under this policy some localised coastal squeeze impacts will be experienced in later epochs. However, these are countered by habitat growth within the middle reaches of the estuary and the recommended policy is deemed technically and environmentally viable, for the duration of the Shoreline Management Plan.

Preferred policies to implement Plan:

From present day: The present day policy for Rushenden to Sheerness is to continue to **hold the line** by maintaining and improving the existing defences to protect the significant assets contained within the towns and port; including assets that are important to the national economy and national heritage. This will be achieved by continuing to maintain and where required upgrade or replace existing defences, which comprise embankments, seawalls and quay walls. Intertidal areas will be subject to continued erosion in confined sections of the channel.

Medium-term: The medium term policy is to continue to **hold the line**. This will be achieved by maintaining and upgrading the defence structures to continue protection to the significant built assets from sea level rise. Intertidal areas will continue to erode in confined sections of the channel, as such, natural dredging of the channel will be beneficial to navigation.

Long-term: The significant built assets along this frontage dictate that the long-term policy is **hold the line**. To accomplish this and to keep pace with sea level rise defences will need to be maintained and upgraded. Thus the character of some sections of this frontage is likely to change to one that is purely defensive, e.g. at Queenborough, which may in the long term affect the landscape value of the Conservation area.

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Location reference:	**Rushenden to Sheerness**
Policy Unit reference:	**E4 29**
	The intertidal area will narrow further with coastal squeeze in constrained areas.

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Rushenden to Sheerness***
Policy Unit reference:	***E4 29***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure and agricultural land during this period.	Designated landscape of the industrial area maintained.	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat due to coastal squeeze in confined channel locations. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".	Potential loss of unknown heritage buried in intertidal zone.	No loss of properties or community facilities. Footpaths, amenity and recreational features will remain.
20-50 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure	Designated landscape of the industrial area maintained but with increased defences. Larger	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat	Potential loss of unknown heritage buried in intertidal zone.	No loss of properties or community facilities. Footpaths, amenity and

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Location reference:	***Rushenden to Sheerness***
Policy Unit reference:	***E4 29***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
		and agricultural land during this period.	defences may affect landscape character.	due to coastal squeeze in confined channel locations. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".		recreational features will remain.
50-100 years	Undertake engineering works to hold the defence line.	Defences will continue to provide the appropriate standard of protection to built assets, infrastructure	Designated landscape of the industrial area maintained but with increased defences. Larger	Effect on internationally designated intertidal habitat and nationally important (BAP) habitat	Potential loss of unknown heritage buried in intertidal zone.	No loss of properties or community facilities. Footpaths, amenity and recreational features will

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

Location reference:	***Rushenden to Sheerness***
Policy Unit reference:	***E4 29***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
		and agricultural land during this period.	defences may affect landscape character.	due to coastal squeeze in confined channel locations. No loss of internationally designated coastal grazing marsh. Potential coastal squeeze/ accelerated erosion in constrained reach of Medway Estuary, with associated failure of WFD objective 2, "no changes that will cause failure to meet surface water "good" ecological status or potential (where potential relates to HMWB or AWB) or result in a deterioration of surface water ecological status/potentials".		remain.

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Location reference:	**Medway Islands**
Policy Unit reference:	**E4 30**

SUMMARY OF THE PLAN AND JUSTIFICATION

Plan:

A number of saltmarsh islands located in the middle estuary of the Medway. Hoo Saltmarsh Island is used as a dredging disposal site. Nationally significant Scheduled Monuments are located on Hoo Saltmarsh Island (Hoo Fort SM) and Darnet Ness (Darnet Fort SM). Nor Marsh Island forms part of Nor Marsh and Motney Hill RSPB Reserve. Island habitats are nationally and internationally designated for their ecological value and are of landscape importance.

The long term policy for this unit is to maintain the environmental and landscape value of the frontage by allowing the continuation of natural erosion and periodic inundation of the islands. It is considered unsustainable and uneconomic to protect the individual heritage features in the long term.

An ongoing monitoring programme is required to assess the future management needs of the islands.

Preferred policies to implement Plan:

From present day: The present day policy for the Medway Islands is **no active intervention**. This will maintain the environmental and landscape value and free functioning shorelines. However, the heritage assets will become increasingly exposed and potentially eroded.

Evolution of intertidal areas will be dependant on sediment supply. It is predicted that some islands will continue to remain stable as sediment supply is expected to be able to meet demand throughout this epoch. However, other islands such as Burntwick Island, lying adjacent to the main Medway channel, will continue to experience net erosion.

Ongoing monitoring of the islands will continue throughout this epoch to examine present and future evolution of island habitats to help assess future management requirements.

Medium-term: As long as environmental and technical benefits are confirmed by further studies, the medium term policy is to continue allowing natural processes under a policy of **no active intervention.** Erosion of the disposal site may be initiated as sea levels rise. Heritage assets will continue to be exposed and actively eroded.

It is predicted that the islands will continue to evolve as per the previous epoch with some remaining stable as sediment supply is expected to be able to meet demand throughout this epoch. However, erosion may become more prevalent along the seaward edge of the marshes as sea levels rise.

Ongoing monitoring of the islands will continue throughout this epoch to examine the evolution of island habitats to help assess future management

Location reference:	**Medway Islands**
Policy Unit reference:	**E4 30**

requirements.

Long-term: If the environmental and technical benefits remain, a long term policy of **no active intervention** will continue. This policy will allow the shoreline of the islands to continue to function and evolve freely, maintaining the environmental and landscape value. Protection of heritage features is considered not viable on economic or environmental grounds, therefore it is anticipated that the Scheduled Monuments will be at increased risk from erosion during this period as sea levels rise, with the potential for eventual loss of the features.

It is expected that erosion of some saltmarsh islands will be exacerbated as sea levels rise and sediment supply in the Medway decreases over this epoch. In some instances this may lead to the complete inundation and loss of some saltmarsh islands.

Ongoing monitoring of the islands will continue throughout this epoch to assess future management requirements.

Location reference: ***Medway Islands***

Policy Unit reference: ***E4 30***

IMPLICATIONS OF THE PLAN FOR THIS LOCATION

Time Period	Management Activities	Material Assets, Infrastructure & Land Use	Landscape	Natural Environment	Historic Environment	Population (Amenity & Recreational Use and Human Health)
0-20 years	Natural processes will be allowed to operate, i.e. erosion and inundation of islands.	Damage to / erosion of built heritage assets.	Designated landscape maintained.	Some effect on internationally designated habitats in contemporary eroding areas, otherwise stability / accretion of habitats. Potential for contamination issues associated with the landfill site on Hoo Island.	Damage to / erosion of Hoo Fort and Darnet Fort SMs. Potential loss of buried unknown heritage.	No recreational objectives identified.
20-50 years	Natural processes will be allowed to operate, i.e. erosion and inundation of islands.	Damage to / erosion of built heritage assets.	Designated landscape maintained.	Some effect on internationally designated habitats in contemporary eroding areas and with inundation as sea levels rise, otherwise stability / accretion of habitats. Potential for contamination issues associated with the landfill site on Hoo Island.	Damage to / erosion of Hoo Fort and Darnet Fort SMs as sea levels rise. Potential loss of buried unknown heritage.	No recreational objectives identified.
50-100 years	Natural processes will be allowed to operate, i.e. erosion and inundation of	Loss of built heritage assets.	Designated landscape maintained.	Potential effect on internationally designated habitats due to sea level rise and a reduced	Eventual loss of SMs as sea levels rise. Potential loss of buried	No recreational objectives identified.

The above provides the <u>local</u> details in respect of the SMP-wide Plan; therefore the above <u>must</u> be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

	islands.			sediment supply to the estuary. Potential for contamination issues associated with the landfill site on Hoo Island.	unknown heritage.	

The above provides the local details in respect of the SMP-wide Plan; therefore the above must be read in the context of the wider-scale issues and policy implications, as presented in the preceding sections and Appendices to this Plan document.

6 ACTION PLAN

6.1 Objectives

The objectives of the Medway Estuary and Swale Action Plan are to:

- facilitate implementation of the Shoreline Management Plan (SMP) policies;
- identify when and where works are expected;
- identify and/or promote studies to further or improve understanding where this is required to resolve policy and/or implementation;
- develop a prioritised programme of strategy plan development and outline plan of possible schemes;
- establish actions required to deal with the consequences of the plan;
- establish actions required to resolve uncertainties;
- promote use of the SMP recommendations in spatial planning;
- establish a process for informing stakeholders of progress;
- identify procedures for the management of the SMP until its next review; and,
- establish a framework to monitor progress against the action plan and initiate future SMP review.

The Action Plan will be implemented by the Lead Authority in partnership with others as necessary. For each Estuary Wide or Policy Unit level action, the SMP proposes lead authorities although final work allocation will be determined by the South East Coastal Group. Action plan progress will be monitored and reviewed by the South East Coastal Group and reported in line with National Indicator 189 (or similar).

The following sections outline the steps required to ensure SMP recommendations are taken forward in the short term, both in planning and coastal defence, and that necessary actions to facilitate the implementation of the longer-term policies are initiated as appropriate.

The Action Plan identifies the steps to be taken in the period up to the next review of the SMP. This is nominally a 5 - 10 year process, however, the SMP provides for reassessment of this timescale should an earlier review be considered necessary.

6.2 Coastal Defence Management Activities

In the most part, the policy recommendations of the Medway Estuary and Swale SMP will be implemented through the process of coastal defence strategy development and the subsequent implementation of coast defence schemes or other coastal management actions. The process of implementation will be underpinned by monitoring of the shoreline to identify ongoing behaviour (to confirm assumptions made in scenario development), together with targeted study and investigation where specific uncertainties need to be addressed to enable policy (short or longer term) implementation.

In this area, parts of the frontage are routinely monitored as part of the South East Strategic Regional Coastal Monitoring Programme. This monitoring is undertaken based on frontage risk and is reviewed

every five years to ensure that appropriate levels of monitoring and reporting is being carried out. The strategic regional monitoring programme is an essential part of the shoreline management processes and a general action from the SMP is to continue with this programme of monitoring and review it every 5 years. Where the Action Plan table below refers to the Strategic Regional Monitoring Programme this includes the proper storage and analysis of data to inform management practices.

The consultation process has also highlighted a need to engage in a more effective way with local politicians, some stakeholders and the general public outside of the SMP process. Specific areas to target may be planning officers, Local Councillors and Local Schools.

Table 6.1 (Key Background Information) identifies the key technical, economic and environmental constraints that apply to the SMP and directs how to approach future work

Table 6.2 (Estuary Wide Actions) identifies the common estuary wide actions required to deliver the SMP effectively. This includes monitoring and technical studies that are required to resolve uncertainties and inform the specific policies and actions.

Table 6.3 (Unit Level Actions) identifies the actions required to facilitate the implementation of the SMP policies for each individual policy unit. It identifies:

- the recommended SMP policy for the unit;
- the nature of works required to implement the short term policy;
- any specific requirements for review of monitoring data from the unit;
- whether studies are required to either clarify or refine the policies or facilitate the medium to long term policies; and,
- the organisation who will be responsible for promoting the actions.

Both Tables set a prioritised programme for undertaking these actions. The relative priorities of each action are identified as:

- Very High (VH) within the next two years
- High (H) within the next five years;
- Medium (M) within the next ten years; and,
- Low (L) within the next twenty years.

For any policy other than No Active Intervention, Table 6.3 of the SMP assumes that all appropriate maintenance activities are undertaken from year 0 for all relevant epochs of the plan e.g. a Low priority action assumes that all required maintenance is undertaken to the coastal defence from year 0 of the plan until that action is undertaken.

It should be noted that the outcomes of ongoing Thames Estuary 2100 (TE2100) studies should be incorporated into these further studies where appropriate.

Table 6.1: Key Background Information

Group	Constraint	SMP Implementation
Techn-ical	Limitations of data relating to estuarine processes	Implement Estuary Wide Actions EW2&3 (Table 6.2) as Very High Priority work and a pre-cursor to inform future coastal management strategies.
Technical	From the desktop research and analysis undertaken for the SMP, the process trends and linkages within the Medway & Swale estuaries can be separated into 3 separate reaches. These reaches have different process drivers, limited interaction and management needs. **Reach 1 – Upper Medway Estuary** (Allington Lock to Rochester). **Reach 2 – Middle & Outer Medway Estuary** (Rochester to Isle of Grain/Sheerness, including western Swale from A249 Isle of Sheppey Crossing to confluence) **Reach 3 – The Swale** (Isle of Sheppey A249 Crossing to Shellness/Faversham Creek)	The SMP recommends implementation of 3 Flood & Coastal Management Strategies aligned to these reaches under Estuary Wide Action EW4 (Table 6.3). These strategies should follow Estuary Wide Action EW3 (Table 6.2) so that SMP uncertainties are closed out. The development of strategies should, wherever possible, precede any changes in estuary management to ensure that reaches are managed as a whole and interactions are controlled.
Technical	**Reach 1 – Upper Medway Estuary** (Allington to Rochester). Typically fluvial geomorphology. Changes in estuary flows (sea level rise/ storminess) and defence alignment (managed realignment) have high potential to affect stability of channel and defences downstream to Rochester, Defences need to change alignment but detail must be informed by geomorphological understanding of whole Upper Medway Estuary. Uninformed and uncontrolled change to defence alignments may have serious detrimental effects up and downstream.	Implement Estuary Wide Action EW3 (Table 6.2) geomorphology studies before other actions in this reach. Manage this reach as whole, not individual units. Implement Estuary Wide Action EW4 prior to planned capital investment.

Group	Constraint	SMP Implementation
Technical	**Reach 2 – Middle & Outer Medway Estuary** (Rochester to Isle of Grain/Sheerness, including western Swale from A249 Isle of Sheppey Crossing to confluence) The constrained outer estuary mouth between Isle of Grain & Sheerness governs the processes in this reach. The mouth is currently constrained and very narrow compared with the bankfull width of the middle estuary. As such the middle estuary is currently primarily accreting and key to managing designated habitats. With sea level rise, accretion rates in the middle estuary will decrease and the outer estuary will be subject to increasing erosion. Any changes to the alignment at the mouth have a significant impact on estuary processes in the reach, changes elsewhere have limited impact.	Pay particular attention to changes of alignment at the mouth of the outer estuary.
Technical	**Reach 3 – The Swale** (Isle of Sheppey Crossing to Shellness/Faversham Creek) The Swale has an enormous floodplain when compared to the current channel alignment. The no active intervention scenario has a significant destabilising impact within this reach and adjacent reaches. The channel is not in equilibrium and needs to change to accomodate sea level rise but changes must be carefully managed as a whole.	Implement Estuary Wide Action EW3 (Table 6.2) geomorphology studies before other actions in this reach. Manage this reach as whole, not individual units. Implement Estuary Wide Action EW4 prior to planned capital investment.
Environmental	The Middle & Outer Medway Estuary and The Swale are heavily designated under the Habitats Regulations as is the adjoining Thames Estuary. Coastal management will often be driven by compliance with this legislation. The available data on the condition and behaviour of the designated interest features is limited. A fuller dataset is required to reinforce or revise the Habitats Regulations Assessment The SMP Actions and Policies are key to managing local Habitats Regulations issues. The SMP Policies & Actions must be coordinated across the whole SMP area in line with the Habitats Regulations Assessment and the assessment reviewed with any variations. The approved Habitats Regulations Assessment justifies both the maintenance and new work recommended in the SMP.	Implement Estuary Wide Action EW3 (Table 6.2) as Very High Priority work and a pre-cursor to inform future coastal management strategies. Individual policies cannot be implemented without consideration of SMP as a whole and Habitats Regulations issues must be at the forefront of local coastal management decisions. All future coastal managers should pay particular attention to the Habitats Regulations Assessments for both this and in combination activities. As long as the SMP is being implemented to plan, maintenance activities do not require separate Habitats Regulations Assessment.

Group	Constraint	SMP Implementation
Economic	The hinterland is primarily rural with major settlements and infrastructure in only a few policy units. As such, in purely the economic appraisal of the SMP, some of the individual policies are uneconomic (cbr<1). It is imperative to note that: 1. Across the whole SMP, the suite of policies is economic (CBr>4). 2. Where individual policies are uneconomic, the hinterland and estuary is designated under the Habitats Regulations and compliance with the law overrides standard economic justification. 3. Where individual policies are uneconomic, adopting a policy of No Active Intervention would have such an impact on estuarine processes that the wider damages would significantly outweigh the cost of intervention.	The business case for intervention must be made strategically and not unit by unit. Implement Estuary Wide Action EW4 (Table 6.2) as High Priority work and seek strategic business case approval.

Table 6.2: Estuary Wide Actions.

Estuary SMP Wide Action	Action promoted by	Code	Priority
Assign policy unit specific actions to relevant member of the Coastal Group. Assigned actions to be resourced by relevant coastal group member. Where relevant, inform non-coastal group members of the SMP recommendations and the actions required of them	South East Coastal Group	EW1	VH
Continue Regional Coastal Monitoring Programme topographic and habitat surveys on the Medway Estuary & Swale	Environment Agency (lead), South East Coastal Group	EW2	VH
Execute Habitats Regulations Assessment Conditions through the implementation of a) Medway Estuary & Swale Habitat & Process Study (MESHPS) b) Regional Habitat Creation Programme MESHPS shall include: i) Ecological monitoring to establish baseline information of Natura 2000 site interest features and habitats. Survey and investigation to determine least damaging managed realignment extent ii) Geomorphological monitoring in estuaries to establish robust baseline understanding. Building on this, simulate and forecast the future morphological evolution of the Medway Estuary & Swale taking into consideration sediment supply, climate change, sea level rise and increased fluvial flows.	Env. Agency (lead), Natural England (lead ecology) As above + Maritime Councils	EW3	VH VH

Progress the following Strategies within the SMP area: 1. **Upper Medway Estuary** (Allington Lock to Rochester). 2. **Middle & Outer Medway Estuary** (Rochester to Isle of Grain/Sheerness, including western Swale from A249 Isle of Sheppey Crossing to confluence) 3. **The Swale** (Isle of Sheppey A249 Crossing to Shellness/Faversham Creek) These strategies will be developed in line with the current guidance of the time. They will determine the preferred flood and coastal risk management option, alignment and level of protection required to achieve the SMP policies. For the SMP to be implementable, the business case for intervention should be made strategically, not for stand alone schemes in stand alone units. (see Table 6.1, Economics). The Strategies should be progressed in a coordinated way or in a package to ensure that process linkages and common impacts are managed properly. The strategies will rely upon and be informed by the Medway Estuary & Swale Habitat & Process Study (MESHPS). As such, work on the MESHPS shall commence before strategy development	Environment Agency (lead), Natural England and Maritime Councils	EW4	H H
Roll out and integrate SMP into Development Control via Kent Planning Officers group, one to one meetings, Environment Agency Development Control	Medway DC (lead), TMBC, Swale BC, EA	EW5	VH
Share findings of SMP with partner bodies and strategic plans to ensure coordinated coastal management .Continuously review the progress and cross compliance of adjacent studies.	EA (lead) supported by coastal group	EW6	VH
Develop Communications Plan and Programme to inform people affected by a change in coastline and to start the adaptation process. This shall include a plan for securing or continuing private management and funding of defences where appropriate	All, KCC (lead)	EW7	H
Disseminate lessons and share knowledge on SMP2 development with others (including Habitats Regulations, Water Framework & Strategic Environmental Assessment)	Environment Agency	EW8	VH

Table 6.3: Unit Level Actions: Coastal defence management activities, monitoring and study requirements

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
E4 01	**Grain Tower to Colemouth Creek**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to maintain revetments and sea walls around the commercial and industrial assets.	**L**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Survey, record and monitor Scheduled Monuments.	**H** **L**	Coastal Defence Strategy to develop the optimum hold the line solution, to also include a fuller economic evaluation. Ongoing TE2100 studies and the Greater Thames Estuary CHaMP should be incorporated into the strategy.	**L**	Thamesport; E.ON UK Medway Council Environment Agency English Heritage
E4 02	**Colemouth Creek to Bee Ness Jetty**	MR with localised HTL	MR with localised HTL	MR with localised HTL	Engage with affected parties to enable adaptation to the change in coastline. Construct realigned set-back defences where MR (dependant on the outcomes of further studies regarding MR and realignment positions). Undertake engineering works and maintenance activities to hold the defence line along localised sections of embankment and revetment, to protect key assets.	**H** **M** **L**	Undertake study to establish area of acceptable modification of freshwater habitat Monitor frontage as part of the Strategic Regional Monitoring Programme. Survey, record and monitor unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**H** **H** **M** **M**	Studies will be required to: - investigate the MR with localised HTL policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - undertake a fuller economic evaluation; and, - determine the acceptable modification and best management of designated freshwater habitat.	**H** **H** **H** **H**	Medway Council Environment Agency Network Rail English Heritage Natural England
E4 03	**Kingsnorth Power Station**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to	**L**	Monitor frontage as part of the Strategic Regional Monitoring Programme.	**H**			E.ON UK Environment

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
					maintain embankments and revetments around the industrial assets and infrastructure.						Agency
E4 04	**Power Station to Cockham Wood**	MR with localised HTL	MR with localised HTL	MR with localised HTL	Engage with affected parties to enable adaptation to the change in coastline. Construct realigned set-back defences where MR (dependant on the outcomes of further studies regarding MR and realignment positions). Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments, revetments and seawalls along localised sections protecting key assets.	**H** **M** **L**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**H** **H** **M** **M**	Studies will be required to: - investigate the MR with localised HTL policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - undertake a fuller economic evaluation; and, - determine the acceptable modification and best management of designated freshwater habitat.	**H** **H** **H** **H**	Medway Council Environment Agency Residential Marine English Heritage Natural England
E4 05	**Cockham Wood**	NAI	NAI	NAI			Monitor shoreline retreat and erosion, and survey as part of the Strategic Regional Monitoring programme and monitor the Scheduled Monument, to pro-actively implement exit plan strategy if and when required.	**H**	Develop plan for management of shoreline retreat and erosion, relocation of paths, recording heritage features.	**M**	Medway Council English Heritage Environment Agency
E4 06	**Lower Upnor to Medway**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to	**M** – between	Survey, record and monitor Scheduled Monument which	**M**			Medway Council Environment

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
	Bridge				hold the defence line, to maintain sea walls, revetments and sheet piling.	Rochester Bridge and Medway Bridge **L** – between Lower Upnor and Rochester Bridge	forms part of the defence line.				Agency English Heritage
E4 07	**Medway Bridge to North Halling**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and small sections of sea wall.	**H**					Medway Council Environment Agency Network Rail

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
E4 08	**North Halling to Snodland**	MR with localised HTL	MR with localised HTL	MR with localised HTL	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and concrete walls along localised sections. Construct realigned set-back defences where MR (dependant on the outcomes of further studies regarding MR and realignment positions).	**H** **H** **M**	Survey, record and monitor Scheduled Monuments and unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**H** **M**	Studies will be required to: - investigate the MR with localised HTL policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - investigate how the proposed Medway crossing will fit in with the recommended policy; - undertake a fuller economic evaluation; and, - investigate contamination issues where MR is proposed.	**H** **H** **H** **H** **H**	Medway Council Environment Agency English Heritage
E4 09	**Snodland to Allington Lock**	HTL	MR with localised HTL	MR with localised HTL	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and walls.	**H** **M**	Survey, record and monitor Scheduled Monuments and unknown buried heritage features in realignment area.	**M**	Studies will be required to: - investigate the MR with localised HTL policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - undertake a fuller economic evaluation; and, - investigate contamination issues	**M** **M** **M**	Environment Agency English Heritage

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
									where MR is proposed.	**M**	
E4 10	**Allington Lock to North Wouldham**	HTL	MR with localised HTL	MR with localised HTL	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and walls.	**H** **H** – between Allington lock and opposite the Aylesford Paper Mills **M** – between opposite Aylesford Paper Mills and north Wouldham	Survey, record and monitor Scheduled Monuments and unknown buried heritage features in realignment area.	**M**	Studies will be required to: - investigate the MR with localised HTL policy (best technical, environmental and economic option that best manages flood risk); - undertake a fuller economic evaluation; and, - investigate the standard of protection, extent and alignment of set-back defences;	**M** **M** **M**	Medway Council Environment Agency English Heritage
E4 11	**Wouldham Marshes**	MR	MR	MR	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the line in sections, to maintain embankments protecting key assets. Construct realigned set-back defences where MR	**H** **M** **M**	Survey, record and monitor unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**M** **M**	Studies will be required to: - investigate the MR policy (best technical, environmental and economic option that best manages flood risk); - undertake a fuller economic evaluation; and, - investigate the standard of protection, extent and alignment of set-back defences.	**H** **H** **H**	Medway Council Environment Agency English Heritage

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
					(dependant on the outcomes of further studies regarding MR and realignment positions).						
E4 12	**Medway Bridge to West St Mary's Island**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to maintain seawalls.	**L**	Survey, record and monitor Scheduled Monuments and historic defences.	**M**			Medway Council Chatham Dockyard Environment Agency English Heritage
E4 13	**St Mary's Island to The Strand**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, by maintaining and improving seawalls and revetments.	**L**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Survey, record and monitor historic assets and defences.	**H** **M**			Medway Council Environment Agency English Heritage
E4 14	**The Strand to West Motney Hill**	HTL	MR	MR	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line, to maintain revetted banks.	**H** **L**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in realignment area.	**H** **H** **L**	Studies will be required to: - investigate the MR policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - undertake a fuller economic evaluation; and, - investigate contamination issues where MR is proposed.	**M** **M** **M** **M**	Medway Council Environment Agency English Heritage

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
E4 15	**Motney Hill to Ham Green**	MR with localised HTL	MR with localised HTL	MR with localised HTL	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line along localised sections, to maintain revetted banks protecting key assets. Construct realigned set-back defences where MR (dependant on the outcomes of further studies regarding MR and realignment positions).	**H** **L** **M**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**H** **H** **M** **M**	Studies will be required to: - investigate the MR with localised HTL policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - investigate contamination issues where MR is proposed; - undertake a fuller economic evaluation; and, - determine the acceptable modification and best management of designated freshwater habitat.	**H** **H** **H** **H** **H**	Medway Council Swale Borough Council Environment Agency English Heritage Natural England
E4 16	**Ham Green to East of Upchurch**	NAI	NAI	NAI	Engage with affected parties to enable adaptation to the change in coastline.	**H**	Monitoring shoreline retreat and erosion as part of the Strategic Regional Monitoring Programme, to pro-actively implement exit plan strategy if required. Survey and record unknown buried heritage features.	**H** **L**	Develop exit plan for management of shoreline retreat and erosion, and safe removal of greenhouses and property if required.	**L**	Swale Borough Council Environment Agency English Heritage
E4 17	**East Upchurch to East Lower**	MR with loca	MR with loca	MR with loca	Engage with affected parties to enable adaptation to the change in coastline.	**H**	Monitor frontage as part of the Strategic Regional Monitoring Programme.	**H**	Studies will be required to: - investigate the MR with localised HTL policy (best technical,	**H**	Swale Borough Council Environment

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
	Halstow	lise d HTL	lise d HTL	lise d HTL	Construct realigned set-back defences where MR (dependant on the outcomes of further studies regarding MR and realignment positions). Undertake engineering works and maintenance activities to hold the defence line along localised sections, to maintain revetted banks.	**M** **L**	Survey, record and monitor unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**M** **M**	environmental and economic option that best manages flood risk); - undertake a fuller economic evaluation; and, - investigate the standard of protection, extent and alignment of set-back defences.	 **H** **H**	Agency English Heritage
E4 18	**Barksore Marshes**	MR	NAI	NAI	Engage with affected parties to enable adaptation to the change in coastline. Construct realigned defences in a set-back position where required (dependant on the outcomes of further studies regarding MR and realignment positions).	**H** **M**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Monitoring to examine present and future shoreline evolution, e.g. erosion rates, to pro-actively implement exit plan strategy for loss of road if and when required. Undertake study to establish area of acceptable modification of freshwater habitat Monitor habitat changes in MR area. Survey, record and monitor unknown buried heritage features in realignment area.	**H** **H** **H** **M** **M**	Studies will be required to: - investigate the MR policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - investigate contamination issues where MR is proposed; - undertake a fuller economic evaluation; - determine the acceptable modification and best management of designated freshwater habitat; and, - investigate the viability of a future NAI management option.	 **H** **H** **H** **H** **H** **M**	Swale Borough Council Environment Agency English Heritage Natural England

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
E4 19	**Funton to Raspberry Hill**	NAI	NAI	NAI	Engage with affected parties to enable adaptation to the change in coastline.	**H**	Monitoring shoreline retreat and erosion as part of the Strategic Regional Monitoring Programme, to pro-actively implement exit plan strategy if required. Survey and record unknown buried heritage features.	**H** **L**	Develop exit plan for management of shoreline retreat and erosion, and eventual loss of the road.	**L**	Swale Borough Council Environment Agency English Heritage KCC Highways
E4 20	**Chetney Marshes**	MR	MR	MR	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line along localised sections, to maintain revetted banks protecting key assets. Construct realigned set-back defences where MR (dependant on the outcomes of further studies regarding MR and realignment positions).	**H** **M** **M**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Bird surveys due to the importance of the area for wildfowl breeding which may be affected with MR. Survey, record and monitor unknown buried heritage features in realignment area. Undertake study to establish area of acceptable modification of freshwater habitat Monitor habitat changes in MR area.	**H** **H** **H** **H** **M**	Studies will be required to: - investigate the MR policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - undertake a fuller economic evaluation; and, - determine the acceptable modification and best management of designated freshwater habitat.	**H** **H** **H** **H**	Swale Borough Council Environment Agency English Heritage Natural England
E4 21	**Kingsferry Bridge to Milton Creek**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and	**L**	Monitor frontage as part of the Strategic Regional Monitoring Programme.	**H**			Swale Borough Council Environment

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
					revetments.						Agency
E4 22	**Milton Creek**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and revetments.	**L**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Monitor frontage as part of the Strategic Regional Monitoring Programme. Survey, record and monitor unknown buried heritage features in Milton Creek	**H** **H** **L**	Studies will be required to investigate the affect of groundwater extraction on groundwater levels.	**M**	Swale Borough Council Environment Agency English Heritage
E4 23	**Murston Pits to Faversham**	HTL	MR with localised HTL	MR with localised HTL	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and revetments.	**H** **L**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in the creeks.	**H** **H** **L**	Studies will be required to: - determine the acceptable modification and best management of designated freshwater habitat; - investigate the MR with localised HTL policy (best technical, environmental and economic option that best manages flood risk); - investigate the impact on groundwater level management; - investigate the standard of protection, extent and alignment of set-back defences; and, - undertake a fuller economic evaluation.	**H** **M** **M** **M** **M**	Swale Borough Council Environment Agency English Heritage Natural England

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
E4 24	**Faversham to Nagden**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and revetments.	**L**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Survey, record and monitor unknown buried heritage features in Faversham Creek.	**H** **L**			Swale Borough Council Environment Agency English Heritage
E4 25	**Shell Ness to Sayes Court**	MR	MR	MR	Engage with affected parties to enable adaptation to the change in coastline. Construct realigned set-back defences (dependant on the outcomes of further studies regarding MR and realignment positions).	**H** **M**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**H** **H** **M** **M**	Studies will be required to: - investigate the MR policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - develop an exit plan for the safe relocation of people and removal of properties at Shell Ness; - investigate the impact on groundwater level management; - undertake a fuller economic evaluation; and, - determine the acceptable modification and best management of designated freshwater habitat.	**H** **H** **H** **H** **H** **H**	Swale Borough Council Environment Agency English Heritage Natural England
E4 26	**Sayes Court to North Elmley Island**	MR	MR	MR	Engage with affected parties to enable adaptation to the change in coastline.	**H**	Monitor frontage as part of the Strategic Regional Monitoring Programme.	**H**	Studies will be required to: - investigate the MR policy (best technical, environmental and	**H**	Swale Borough Council Environment

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
					Construct realigned set-back defences (dependant on the outcomes of further studies regarding MR and realignment positions).	**M**	Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in realignment area. Monitor habitat changes in MR area.	**H** **M** **M**	economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - investigate the impact on groundwater level management; - undertake a fuller economic evaluation; and, - determine the acceptable modification and best management of designated freshwater habitat.	**H** **H** **H** **H**	Agency English Heritage Natural England
E4 27	**North Elmley Island to Kingsferry Bridge**	HTL	MR	MR	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and revetments.	**H** **M**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in realignment area	**H** **H** **L**	Studies will be required to: - determine the acceptable modification and best management of designated freshwater habitat; - investigate the MR policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - investigate the impact on groundwater level management; and,	**H** **M** **M** **M**	Swale Borough Council Environment Agency English Heritage Natural England

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
									- undertake a fuller economic evaluation.	**M**	
E4 28	**Kingsferry Bridge to Rushenden**	HTL	MR	MR	Engage with affected parties to enable adaptation to the change in coastline. Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and revetments.	**H** **M**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Undertake study to establish area of acceptable modification of freshwater habitat Survey, record and monitor unknown buried heritage features in realignment area	**H** **H** **L**	Studies will be required to: - determine the acceptable modification and best management of designated freshwater habitat; - investigate the MR policy (best technical, environmental and economic option that best manages flood risk); - investigate the standard of protection, extent and alignment of set-back defences; - investigate contamination issues where MR is proposed; and, - undertake a fuller economic evaluation.	**H** **M** **M** **M** **M**	Swale Borough Council Environment Agency English Heritage Natural England
E4 29	**Rushenden to Sheerness**	HTL	HTL	HTL	Undertake engineering works and maintenance activities to hold the defence line, to maintain embankments and quay walls.	**M**	Monitor frontage as part of the Strategic Regional Monitoring Programme. Survey, record and monitor Scheduled Monuments and historic defences in Queenborough	**H** **L**			Swale Borough Council English Heritage Environment Agency
E4 30	**Medway Islands**	NAI	NAI	NAI			Monitoring island shoreline retreat and erosion as part of the Strategic Regional	**H**	Studies will be required to: - develop an exit or management plan to adapt to shoreline retreat	**L**	Medway Council RSPB

Policy Unit		SMP Policy			Engineering and Maintenance Works and Adaptation for Short Term Policy	Priority	Specific Monitoring Requirements	Priority	Specific Study Requirements	Priority	Actions to be promoted by
							Monitoring Programme, and monitoring of the Scheduled Monuments, to pro-actively implement exit plan strategy if required.		and erosion, recording SM; - investigate contamination issues due to landfill; - determine the acceptable modification and best management of designated freshwater habitat.	**L** **L**	Environment Agency English Heritage Natural England

6.3 Application of the SMP in Spatial Planning

The risk management policies set out in the SMP cannot be implemented through engineering or coastal defence management alone. There is a need for spatial planning to adopt the policies and understand their consequences, such that risk areas are avoided by development, and future changes in policy are facilitated.

Strategic Flood Risk Assessments (SFRAs) are intended to guide development decisions and meet the requirements of the Planning Policy Guidance Note PPG25 Development and Flood Risk. SFRAs have been completed for both the Medway and Swale Estuaries.

Table 6.4 sets out actions which aim to ensure that the SMP policies are appropriately reflected in the relevant Regional Plan and Local Development Frameworks, such that long term coastal erosion and flooding risks are a material consideration in the planning process.

Table 6.4 Actions for spatial planning

Action	Responsibility
1) Communicate the completion of the SMP to the South East England Regional Assembly (SEERA) to ensure appropriate reflection in the Regional Plan.	South East Coastal Group (Chair/Secretary)
2) Communicate the completion of the SMP to South East England Development Agency (SEEDA) to ensure appropriate reflection in the Regional Economic Strategy (RES).	South East Coastal Group (Chair/Secretary)
3) Inform Local Authority Planning Officers of final SMP recommendations and implications.	Local Authority Engineering Officers Kent County Council – Kent Planning Officers Group (KPOG)
4) Submit SMP to Local Authority Planning Committees with recommendation to approve the SMP for consideration in preparation of planning documents and for development control purposes.	Local Authority Planning Officers to report to planning committee
5) Inclusion of the SMP as reference material for, or an annex to, the Local Development Framework.	Local Authority Planning Officers & Planning Committees
6) Promote the use of Strategic Flood Risk Assessment as part of the preparation of development framework documents.	Local Authority and Environment Agency Planning Officers
7) Ensure that SMP policies are integrated into Development Control activities to control development and flood risk. Development Control Teams should pay particular attention to managed realignment and no active intervention policies and any associated drainage issues.	Local Authorities & Environment Agency
8) Promote the development of planning policies to address potential housing stock losses through implementation of ‘realignment’ and ‘no active intervention’ policies.	Local Authority and Environment Agency Planning Officers
9) Promote the consideration of the relocation of land uses that are at risk from erosion or flooding, within the preparation of LDF documents. Identify elements	Local Authority and Environment agency planning officers

Action	Responsibility
of the preferred option policies where this may apply.	

6.4 Further Actions to Facilitate Medium/Long Term Policies

In addition to the specific actions outlined in the proceeding sections, there is also a need for some activities to be progressed, which require consideration at a scale beyond that of the SMP, and therefore are largely beyond the control of the Coastal Group (or its constituent organizations). However, it is important that the need for these studies is promoted with the relevant bodies.

These studies/initiatives and the actions for the Coastal Group are outlined in Table 6.5.

Table 6.5 Further Actions to facilitate medium / long term policies.

Action	Responsibility
1) Formal adoption of the SMP by the lead authority, the Regional Flood Defence Committee, Natural England and other partner authorities.	South East Coastal Group, Elected Members and Local Authority Officers.
2) Promote the investigation, and implementation, of mechanisms to facilitate the removal of 'at risk' assets (properties, infrastructure, etc), to enable the implementation of long term realignment/NAI policies. This will require a review of national policy/legislation.	South East Coastal Group to promote with Defra, through ongoing 'Making Space for Water' initiatives.
3) Promote a formal, policy, link between SMPs and Local Development Frameworks/Regional Plans. This will require Defra and ODPM to review current arrangements.	South East Coastal Group to promote with Defra through Coastal Group Chairs forum.
4) Promote Central Government funding for all consultation/stakeholder activities in the development of SMPs, and strategies/schemes.	South East Coastal Group to promote with Defra through Coastal Group Chairs forum.
5) Take account of overall Plan, i.e. other immediate-term needs and long-term planning, when considering nature conservation commitments.	Natural England and other regulatory/stakeholder organizations.
6) Develop exit strategies/management plans for the relocation of people and removal of assets when they become at risk from erosion.	Local Authority Technical Officers and Planning officers.
7) Develop medium to long-term plans for relocation of services and facilities that will be lost to erosion, e.g. outfalls, highways.	Service and utility providers, highways agencies.
8) Lobby Central Government in defining a clearer position on compensation issues.	Local Authorities, South East Coastal Group and Local Government Association coastal Special Interest Groups.
9) Develop and promote a communication strategy / awareness raising / education of the public with regards to potential future coastal issues and SMP recommendations.	South East Coastal Group to promote in conjunction with Kent County Council and Environment Agency.

6.5 Management of SMP until Next Review

Through the implementation of actions outlined in sections 6.2 to 6.4 it is likely that the technical understanding of this coastline, the basis of some SMP policies, and the wider shoreline management framework may change. As such, it is important that progress against these actions is monitored by the Coastal Group so that any developments which might affect policy, and hence works, are notified, and also so that the need for revision of the SMP can be monitored. Adjacent projects, including the Thames Estuary 2100 study, the Thames Gateway Project, the Isle of Grain to South Foreland SMP2, the North Kent Rivers CFMP and the Greater Thames Estuary CHAMP, should be monitored for cross project changes.

The Action Plan will be managed by the South-East Coastal Group. The Action Plan should be a working document which needs to be regularly reviewed at Coastal Group meetings and updated as and when required.

Tables 6.1 to 6.4 effectively provide a checklist against which progress can be monitored. It will be the responsibility of the Coastal Group to promote and monitor progress, with the Action Plan retained on the agenda for all future Coastal Group meetings.

The Medway Estuary and Swale SMP page of the Group website (http://www.se-coastalgroup.org.uk/) will have an 'Updates' page, on which this Action Plan will be placed and progress against the actions reported. This will include identification of the implications of any study outputs or wider developments for the relevant SMP policies. The 'updates' are important as the means of disseminating progress to stakeholders and, as such, the existence of this page will be reported during the final SMP dissemination process. The responsibility for maintaining the 'Updates' page will remain with the Coastal Group.

It is not possible at this time to set a date for the next review of the SMP. It is considered likely that a 5 to 10 year period may be appropriate. However, it is vital that changes in understanding or the shoreline management framework are monitored to establish if there comes a point (within the next 5 to 10 years) that the SMP policies become sufficiently out of date as to warrant a full review of the plan. This will be a judgment made by the Coastal Group, as it is not possible to prescribe exactly at what point this should be.

Regardless of other developments, it is considered that the review should be undertaken in 10 years (if not before) in order to ensure the policies remain appropriate.